HAYS COUNTY

HILLSIDE TERRACE
PRECINCT NUMBER 2

Hays County Project No. IFB XXXX-XXX

SEE SHEET 2 FOR INDEX OF SHEETS

ROADWAY CLASSIFICATION	DESIGN SPEED
URBAN MAJOR COLLECTOR	HILLSIDE TERRACE: 45 MPH OLD GOFORTH: 30 MPH

ROADWAY	ADT (CURRENT)	ADT (DESIGN YEAR)
	5631 (2019)	21,600 (2039)

ROADWAY	DHV (CURRENT)	DHV (DESIGN YEAR)
	689	2600

ROADWAY	DIRECTIONAL DISTRIBUTION (D)	PERCENT TRUCKS (T)
	72%	5%

NET LENGTH OF ROADWAY (HILLSIDE TERRACE) = 9,410.38 FT (1.782 MILES)
NET LENGTH OF ROADWAY (OLD GOFORTH) = 1,660.94 FT (0.314 MILES)
NET LENGTH OF BRIDGE (HILLSIDE TERRACE) = 0.00 FT (0.000 MILES)
NET LENGTH OF BRIDGE (OLD GOFORTH) = 0.00 FT (0.000 MILES)
NET LENGTH OF PROJECT = 11,071.32 FT (2.096 MILES)

LIMITS: FROM IH 35 NORTHBOUND FRONTAGE ROAD TO FM 2001

FOR THE CONSTRUCTION OF RECONSTRUCTION AND WIDENING OF EXISTING ROADWAY CONSISTING OF BASE, ACP, CULVERTS, STORM DRAIN, SIGNING AND PAVEMENT MARKINGS.

90%
SUBMITTAL

DESIGN WAIVERS:

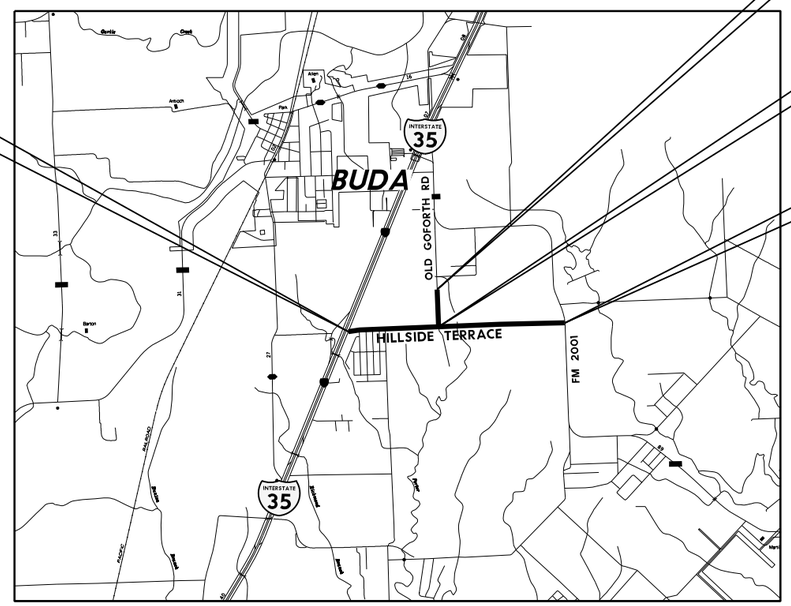
1) CREST VERT.
CURVE AT 13+50
K-VALUE= 19
MEETS 30 MPH.

2) SAG VERT.
CURVE AT 16+45
K-VALUE= 49
MEETS 35 MPH.

3) ROADWAY GRADE
ABOVE MAXIMUM
STA 98+30 TO 105+49.

4) SAG VERT.
CURVE AT 105+49
K-VALUE= 37
MEETS 30 MPH.

BEGIN PROJECT
STA. 12+82.40



END OLD GOFORTH RD
STA. 16+64.90

BEGIN OLD GOFORTH RD
STA. 0+03.96

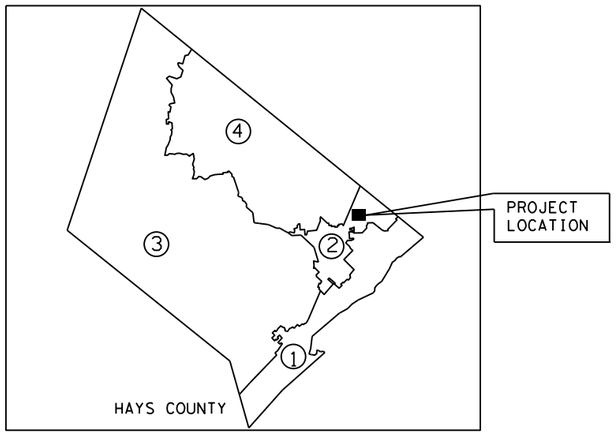
END PROJECT
STA. 106+92.78

N

VICINITY MAP
N.T.S.

EXCEPTIONS: NONE
EQUATIONS: NONE
RAILROAD CROSSINGS: NONE
WATERSHED: BUNTON BRANCH - PLUM CREEK
AREA OF DISTURBANCE: TBD

REQUIRED SIGNS SHALL BE PLACED IN ACCORDANCE WITH STANDARD SHEETS BC(1)-21 THRU BC(12)-21 AND THE "TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.:



TxDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION OF HIGHWAYS, STREETS AND BRIDGES ADOPTED ON NOVEMBER 1, 2014 AND ALL APPLICABLE SPECIAL PROVISIONS AND SPECIAL SPECIFICATIONS AS INDICATED IN THE BID DOCUMENTS SHALL GOVERN ON THIS PROJECT.

APPROVED BY:

COMMISSIONER NAME — DATE
HAYS COUNTY COMMISSIONER, PRECINCT X

APPROVED BY:

JERRY BORCHERDING — DATE
HAYS COUNTY ENGINEER

PREPARED BY:
BGE, INC. (DESIGN CONSULTANT)

ERIN N GONZALES — 1/27/2023 DATE
DIRECTOR

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

ERIN N GONZALES, PE No 102407
DATE: 1/27/2023 , IT IS NOT
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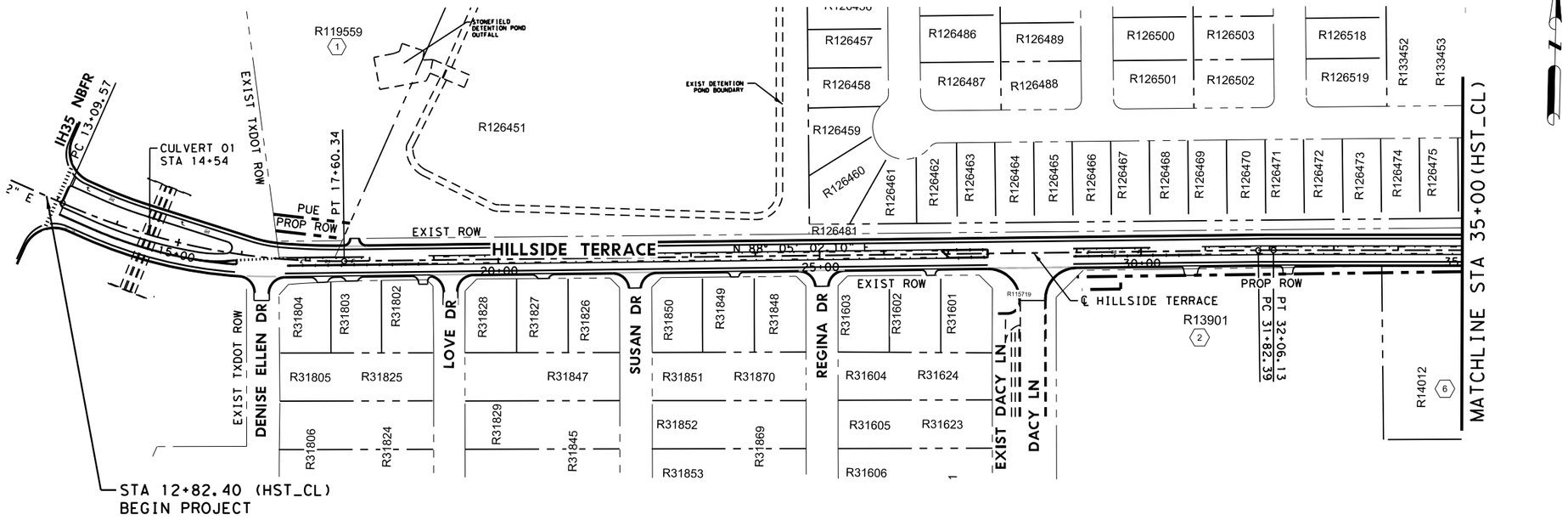
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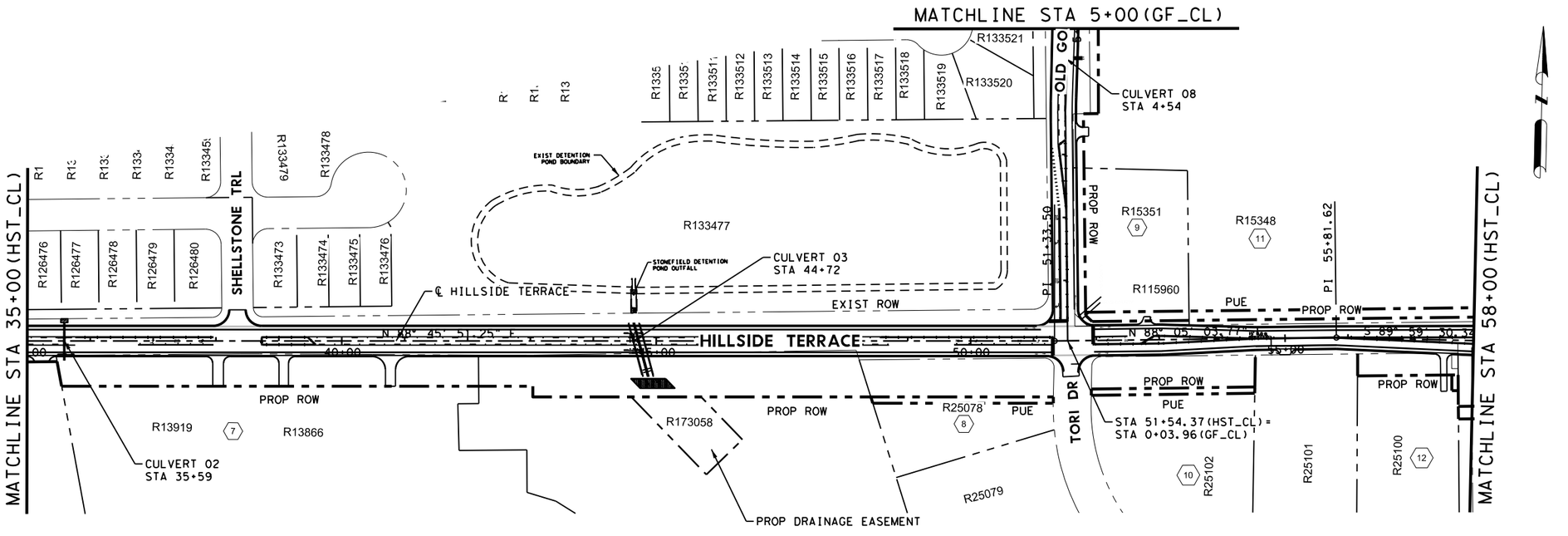
HILLSIDE TERRACE

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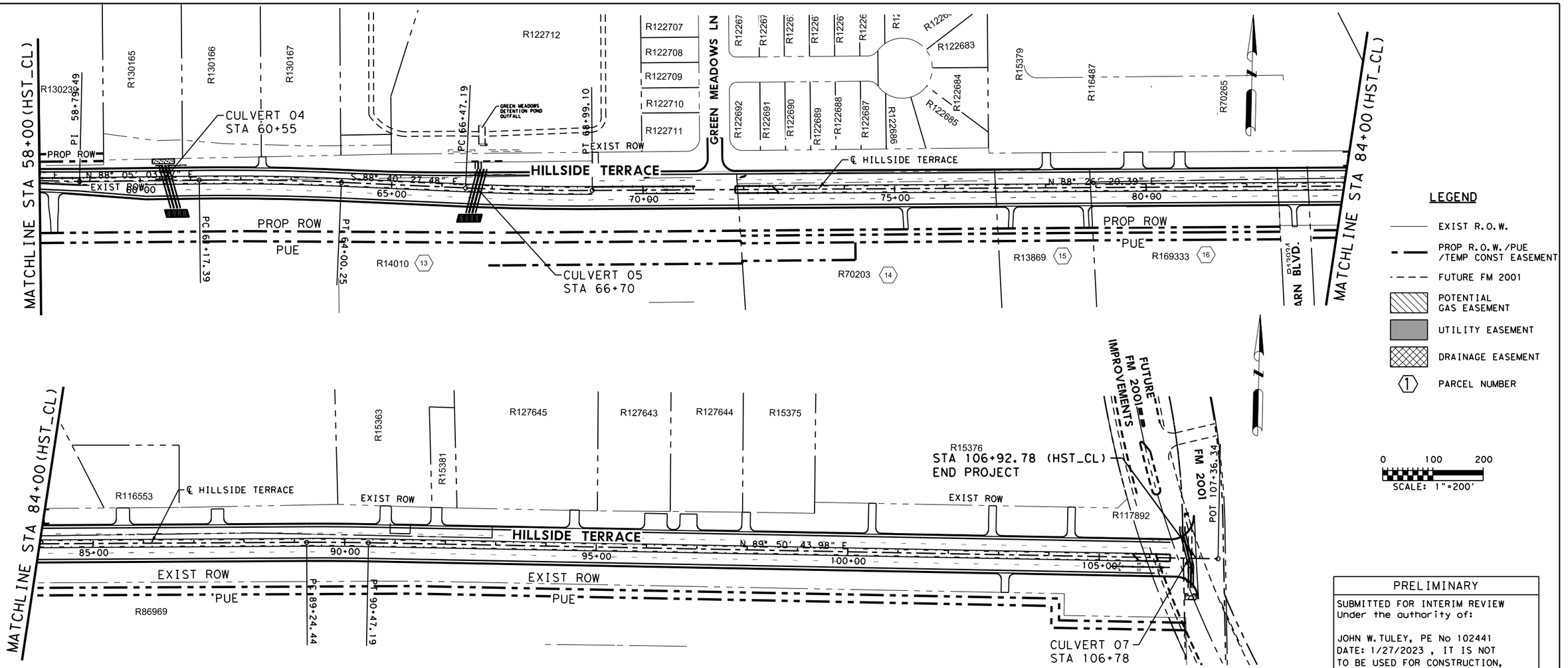
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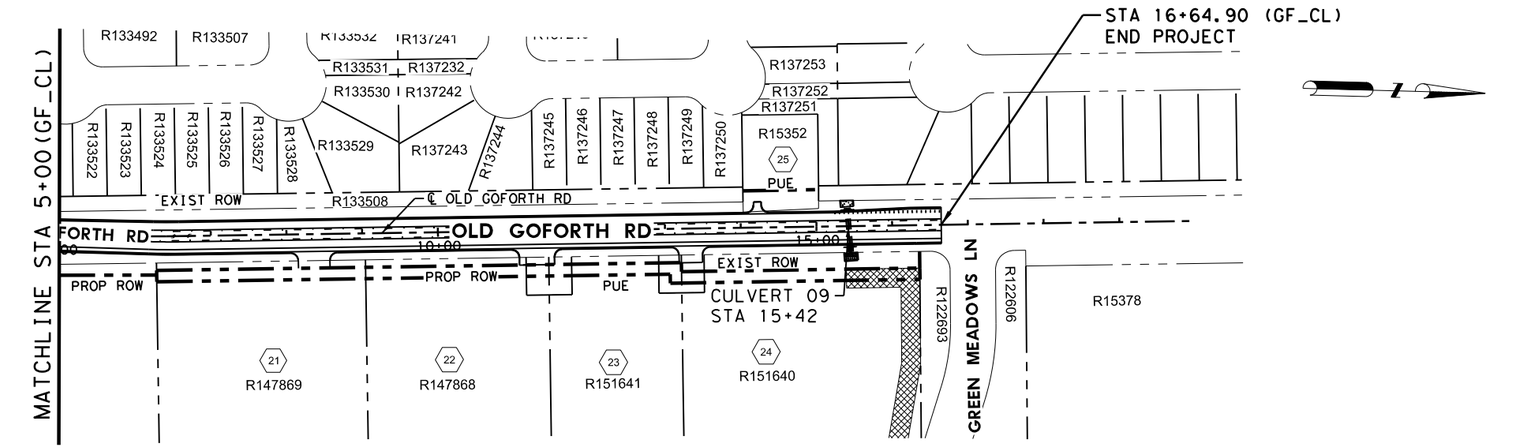
HILLSIDE TERRACE

PROJECT LAYOUT

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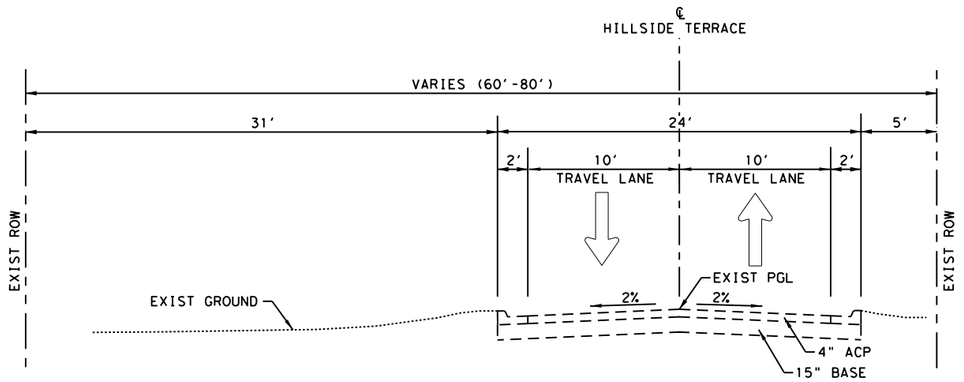
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HILLSIDE TERRACE

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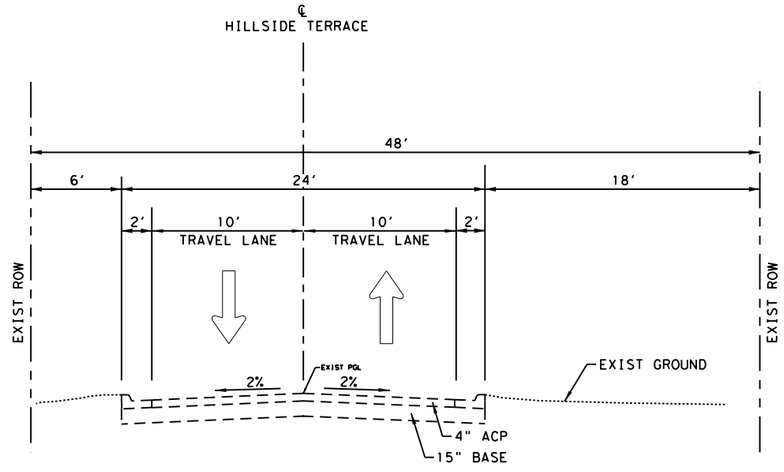
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EXISTING TYPICAL SECTION

HILLSIDE TERRACE
STA 12+82.40 TO STA 51+54.37
PAVEMENT STRUCTURE REMOVAL INCLUDED IN EXCAVATION QUANTITY

0 5 10
SCALE: 1"=10' H
1"=5' V



EXISTING TYPICAL SECTION

HILLSIDE TERRACE
STA 51+54.37 TO STA 71+43.43
PAVEMENT STRUCTURE REMOVAL INCLUDED IN EXCAVATION QUANTITY

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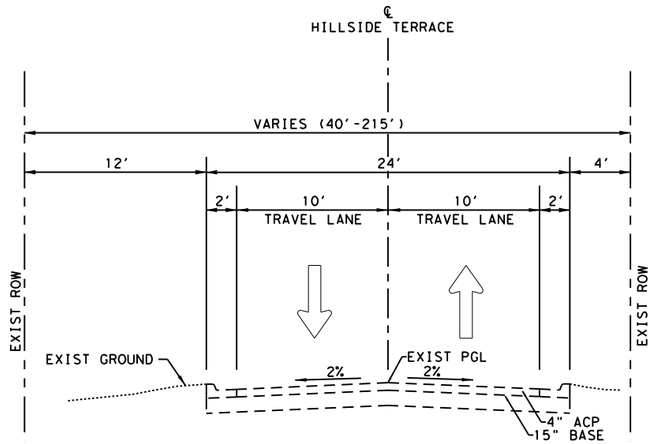
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HILLSIDE TERRACE

EXISTING TYPICAL SECTIONS

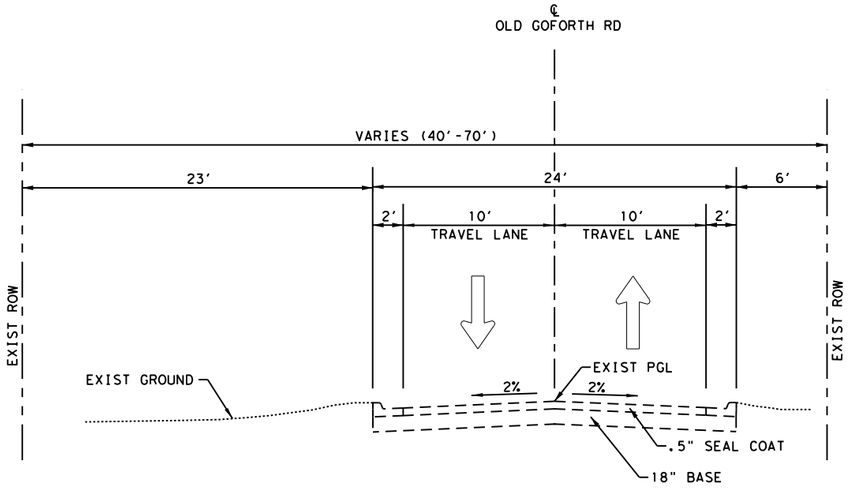
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EXISTING TYPICAL SECTION

HILLSIDE TERRACE
STA 71+43.43 TO STA 106+92.78
PAVEMENT STRUCTURE REMOVAL INCLUDED IN EXCAVATION QUANTITY



EXISTING TYPICAL SECTION

OLD GOFORTH RD
STA 0+53.71 TO 16+64.90
PAVEMENT STRUCTURE REMOVAL INCLUDED IN EXCAVATION QUANTITY

0 5 10
SCALE: 1"=10' H
1"=5' V

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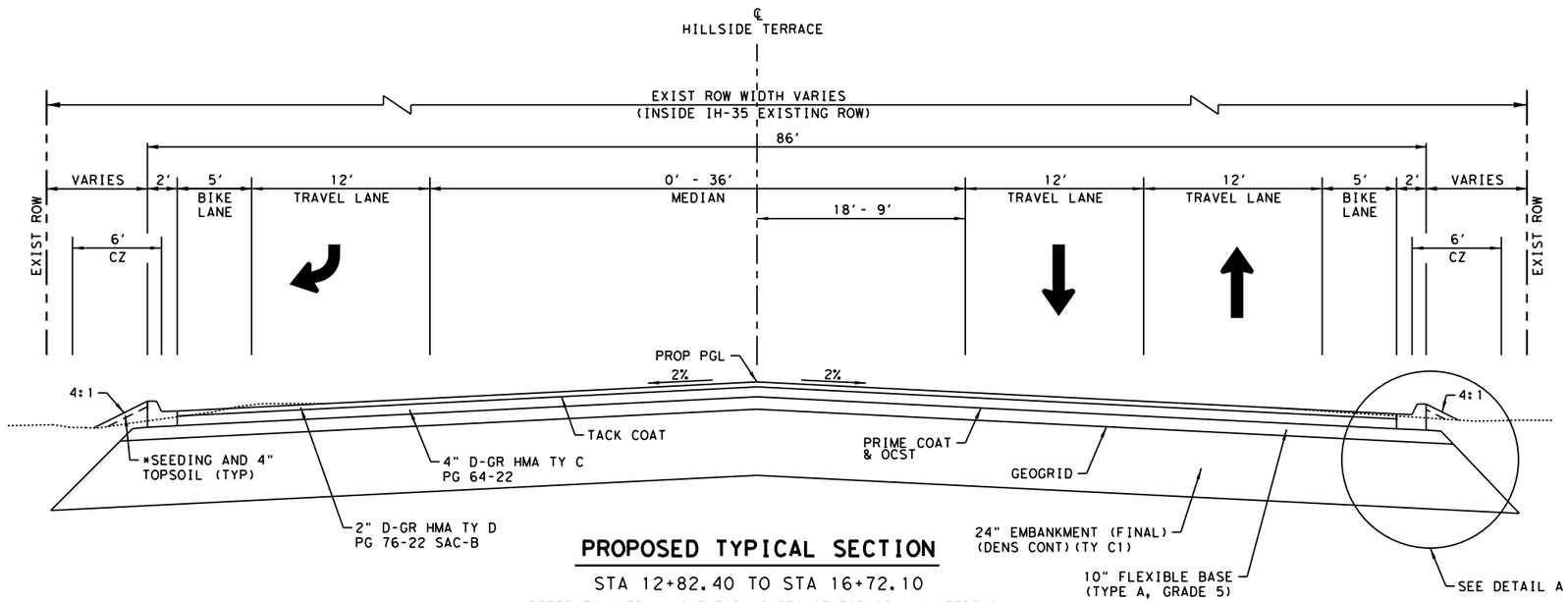
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HILLSIDE TERRACE

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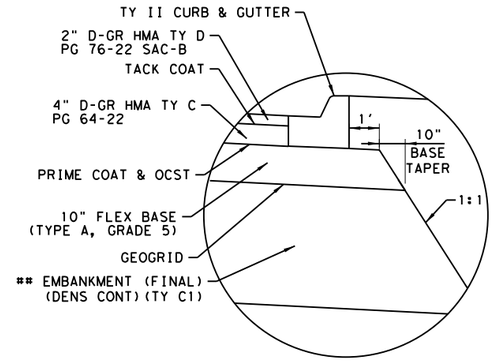
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PROPOSED TYPICAL SECTION

STA 12+82.40 TO STA 16+72.10

*REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING



DETAIL A
NTS

** 24" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 12+82 TO STA 39+50
12" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 39+50 TO STA 106+92
℄ OLD GOFORTH STA 0+00.96 TO STA 16+64.90

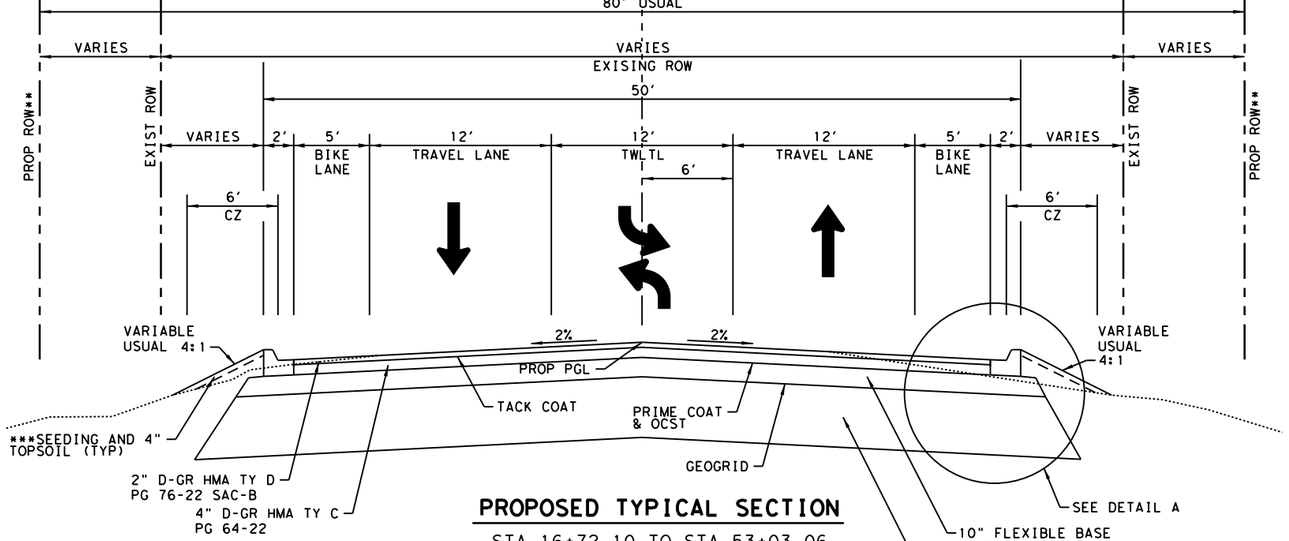
RATE OF APPLICATION:
HMA=110 LBS/SY/IN

TACK COAT=0.08 GAL/SY

OCST=
AC-10-2TR, AC-15P, OR CRS-2P@
0.4 GAL/SY
TY PB GR 3 @ 1 CY/85 SY

PRIME=
RC-250 @ 0.2 GAL/SY
TY E GR 5 @ 1 CY/140 SY

0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

STA 16+72.10 TO STA 53+03.06

* NORMAL CROWN
STA 16+50.00
SUPERELEVATION TRANSITION
STA 50+00.00 TO 51+50.00
FULL SUPERELEVATION
STA 51+50.00 TO 52+00.00
SUPERELEVATION TRANSITION
STA 52+00.00 TO 53+50.00
NORMAL CROWN
STA 53+50.00

* WB LTL STA 28+94.60 TO STA 30+94.60
EB LTL STA 35+75.98 TO STA 37+95.98
WB LTL STA 39+09.02 TO STA 41+29.02
EB LTL STA 48+70.36 TO STA 51+29.68
WB LTL STA 51+95.97 TO STA 54+52.56

** RT PROP ROW STA 29+00.00 TO STA 54+52.56
LT PROP ROW STA 51+95.97 TO STA 54+52.56

*** REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING

LT/RT TIE-DOWN CONDITIONS

4:1 TO CLEAR ZONE, 3:1 TO EXSIT GROUND STA 16+72.10 TO STA 17+75.00
4:1 TO EXIST GROUND STA 17+75.00 TO STA 35+50.00
10:1 2' BERM, 6:1 TO EXISTING GROUND STA 35+50.00 TO STA 48+00.00
4:1 TO EXIST GROUND STA 48+00.00 TO STA 53+03.06

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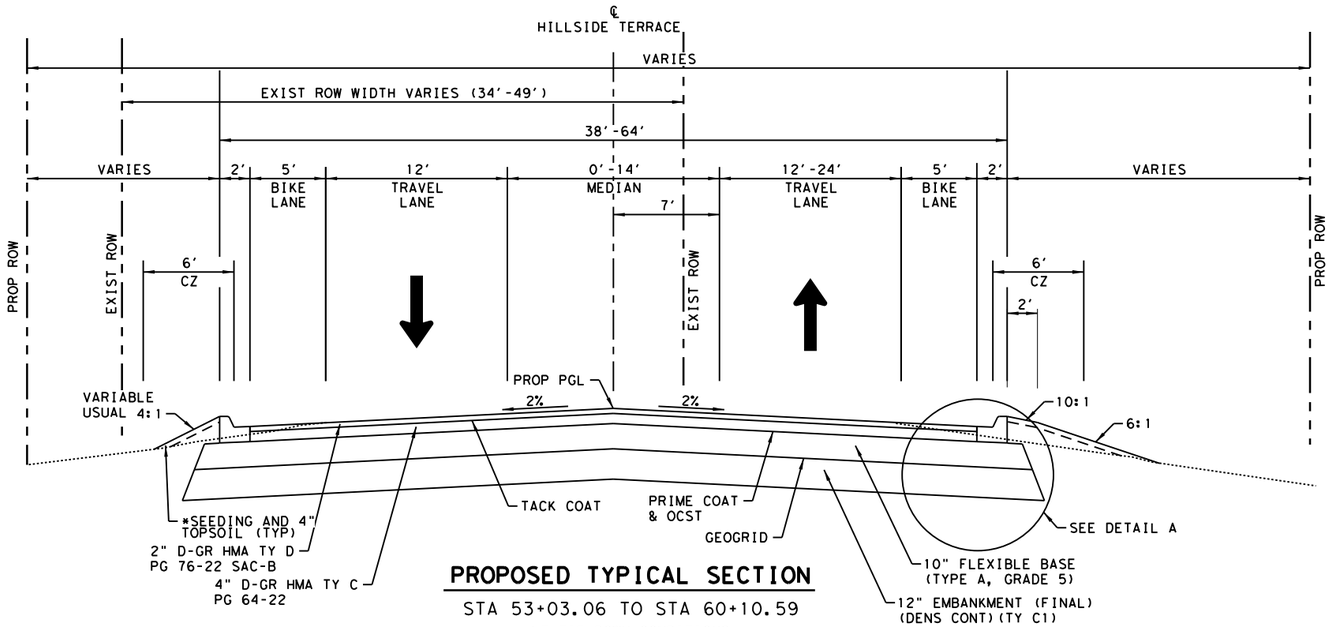
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HILLSIDE TERRACE

PROPOSED TYPICAL SECTIONS

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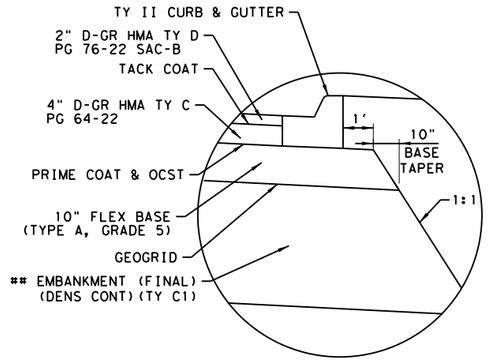
PROPOSED TYPICAL SECTION

STA 53+03.06 TO STA 60+10.59

LT TIE-DOWN CONDITIONS

4:1 TO EXIST GROUND STA 53+03.06 TO STA 57+75.00
4:1 TO CLEAR ZONE, 3:1 TO EXISTING GROUND STA 57+75.00 TO 60+10.59

*REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING



DETAIL A
NTS

** 24" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 12+82 TO STA 39+50
12" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 39+50 TO STA 106+92
℄ OLD GOFORTH STA 0+00.96 TO STA 16+64.90

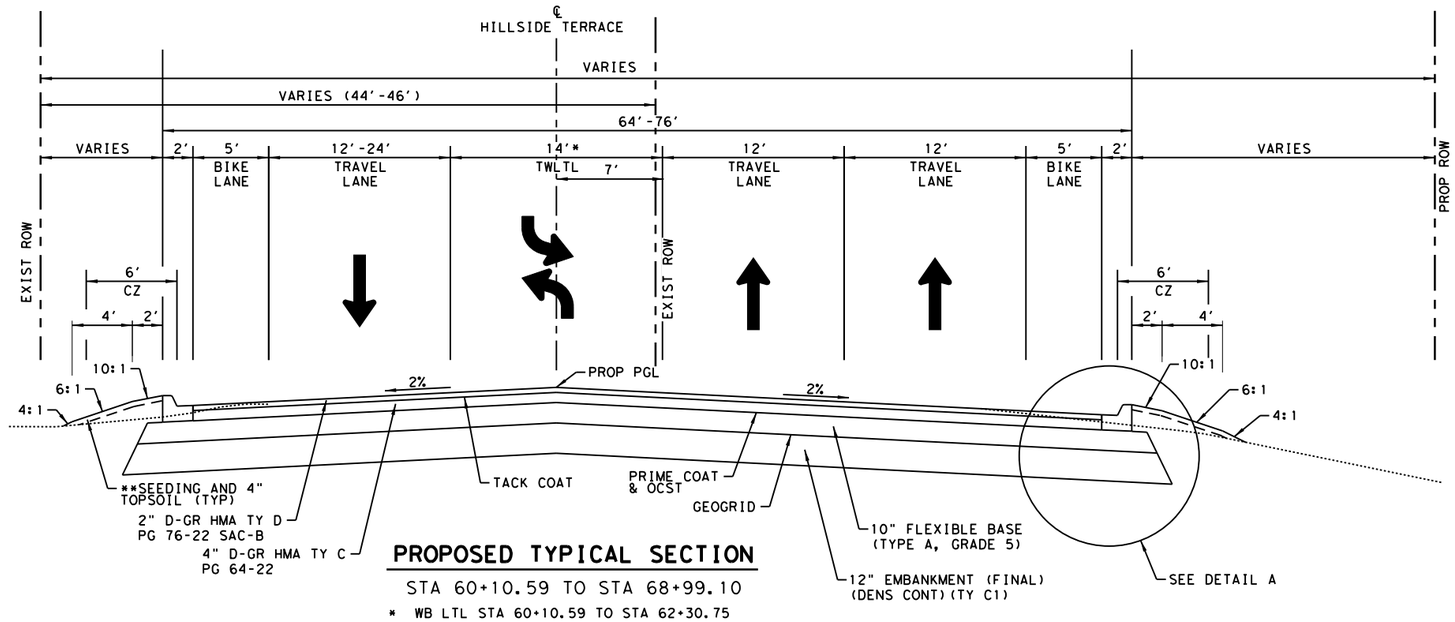
RATE OF APPLICATION:
HMA=110 LBS/SY/IN

TACK COAT=0.08 GAL/SY

OCST=
AC-10-2TR, AC-15P, OR CRS-2P@ 0.4 GAL/SY
TY PB GR 3 @ 1 CY/85 SY

PRIME=
RC-250 @ 0.2 GAL/SY
TY E GR 5 @ 1 CY/140 SY

0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

STA 60+10.59 TO STA 68+99.10

* WB LTL STA 60+10.59 TO STA 62+30.75

** REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING

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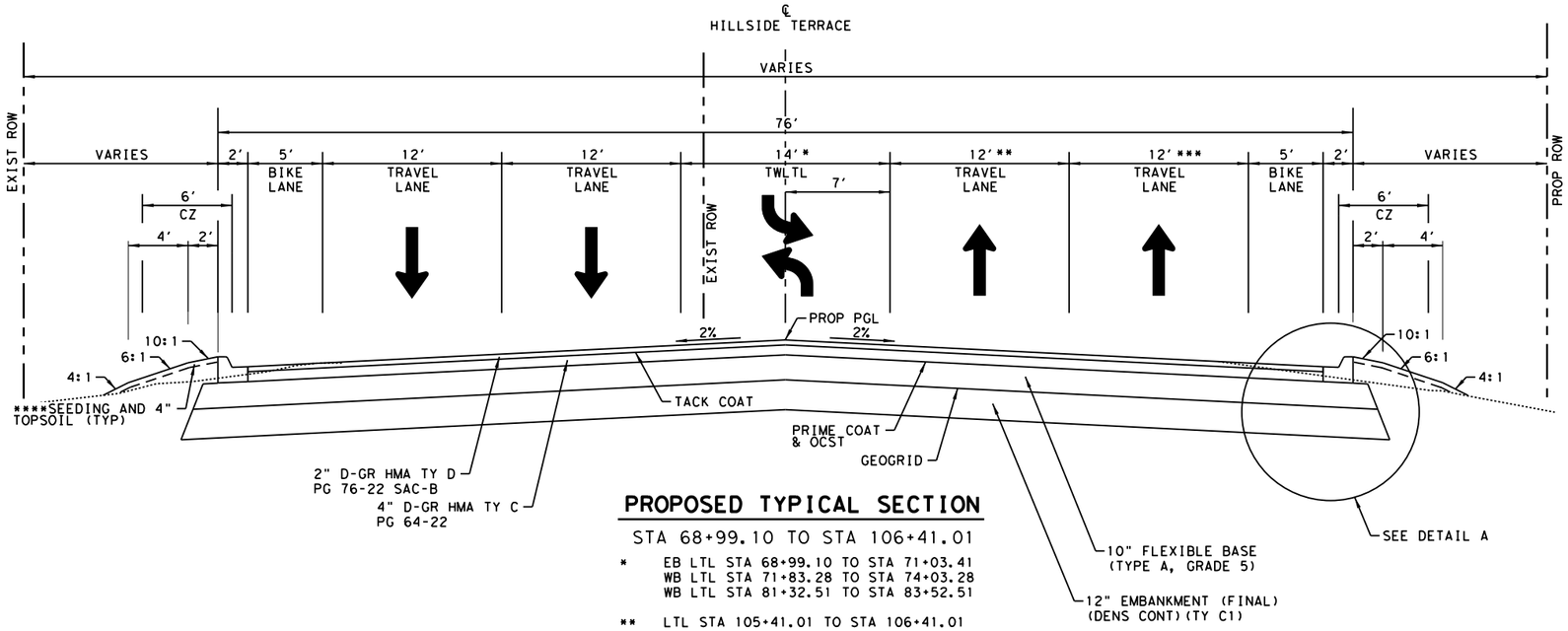
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HILLSIDE TERRACE

PROPOSED TYPICAL SECTIONS

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PROPOSED TYPICAL SECTION

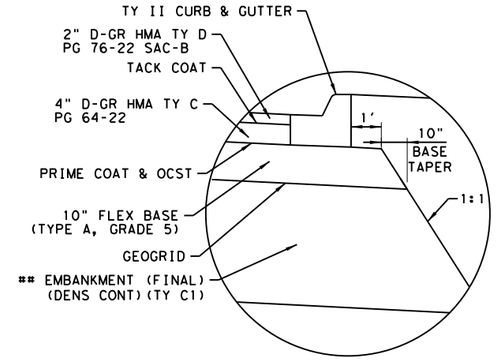
STA 68+99.10 TO STA 106+41.01

* EB LTL STA 68+99.10 TO STA 71+03.41
WB LTL STA 71+83.28 TO STA 74+03.28
WB LTL STA 81+32.51 TO STA 83+52.51

** LTL STA 105+41.01 TO STA 106+41.01

*** RTL STA 105+41.01 TO STA 106+41.01

**** REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING



DETAIL A
NTS

** 24" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 12+82 TO STA 39+50
12" EMBANKMENT (FINAL) (DENS CONT) (TY C1)
℄ HILLSIDE TERRACE STA 39+50 TO STA 106+92
℄ OLD GOFORTH STA 0+00.96 TO STA 16+64.90

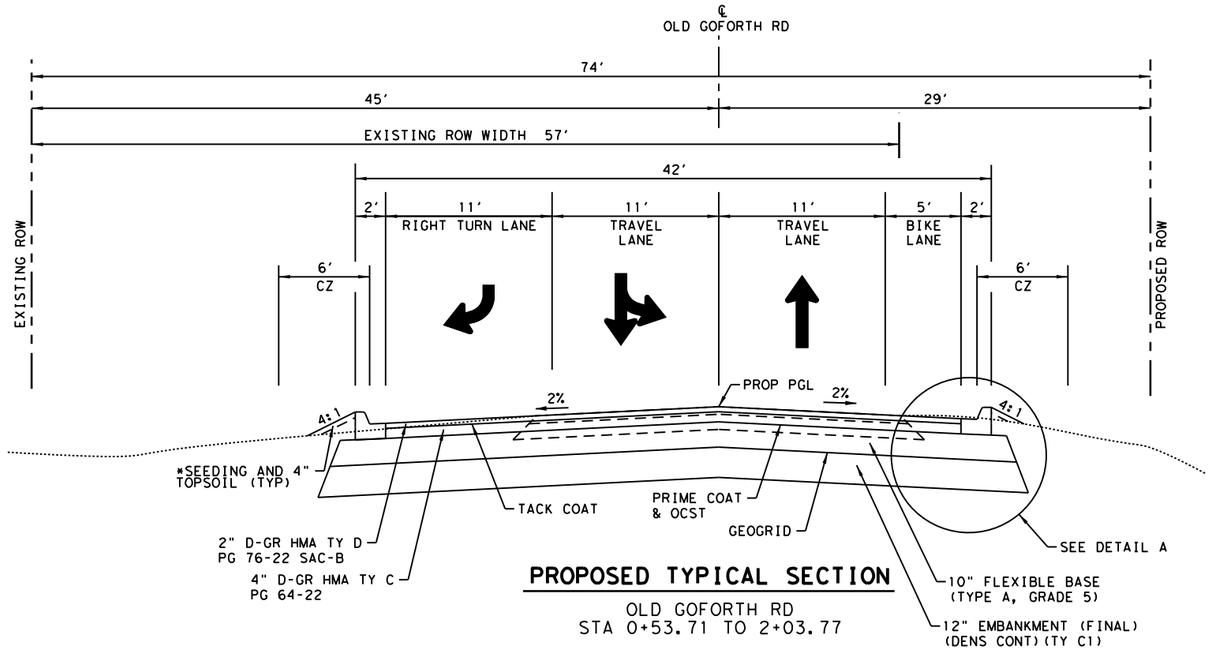
RATE OF APPLICATION:
HMA=110 LBS/SY/IN

TACK COAT=0.08 GAL/SY

OCST=
AC-10-2TR, AC-15P, OR CRS-2P@
0.4 GAL/SY
TY PB GR 3 @ 1 CY/85 SY

PRIME=
RC-250 @ 0.2 GAL/SY
TY E GR 5 @ 1 CY/140 SY

0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

OLD GOFORTH RD
STA 0+53.71 TO 2+03.77

*REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

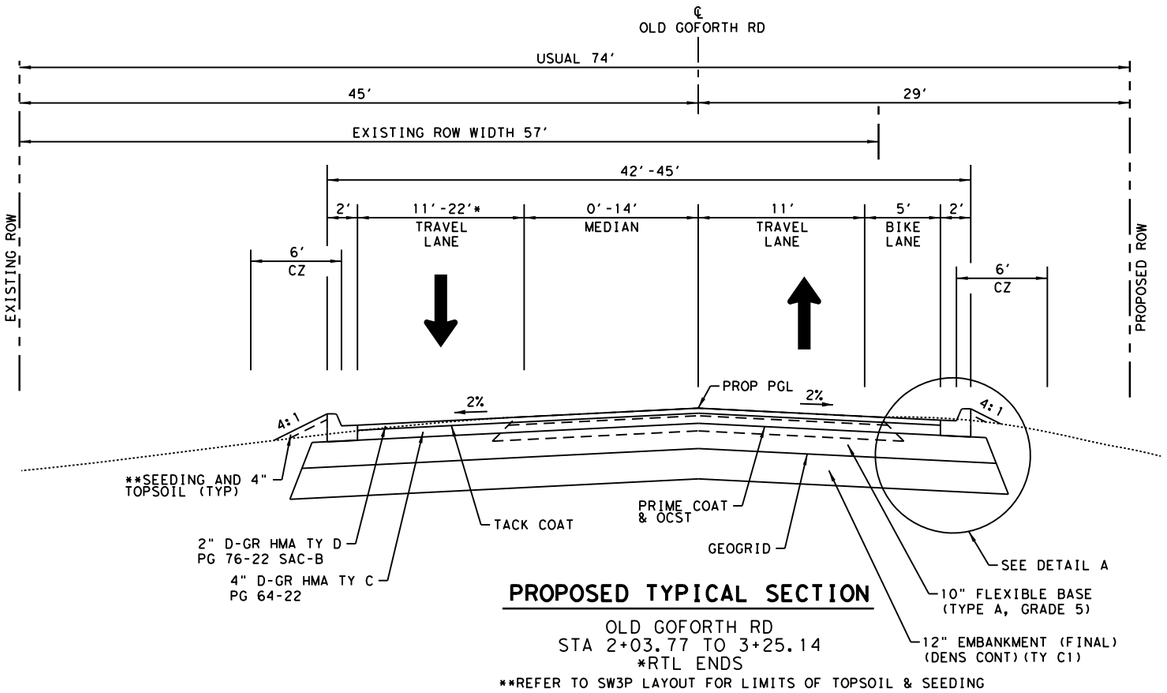
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HILLSIDE TERRACE

PROPOSED TYPICAL SECTIONS

DESIGNED BY:		SHEET 3 OF 4
DRAWN BY:		
CHECKED BY:		10
APPROVED BY:		

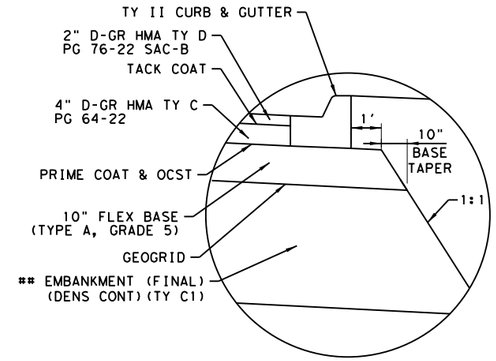
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PROPOSED TYPICAL SECTION

OLD GOFORTH RD
STA 2+03.77 TO 3+25.14
*RTL ENDS

**REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING



DETAIL A
NTS

** 24" EMBANKMENT (FINAL)(DENS CONT)(TY C1)
℄ HILLSIDE TERRACE STA 12+82 TO STA 39+50
12" EMBANKMENT (FINAL)(DENS CONT)(TY C1)
℄ HILLSIDE TERRACE STA 39+50 TO STA 106+92
℄ OLD GOFORTH STA 0+00.96 TO STA 16+64.90

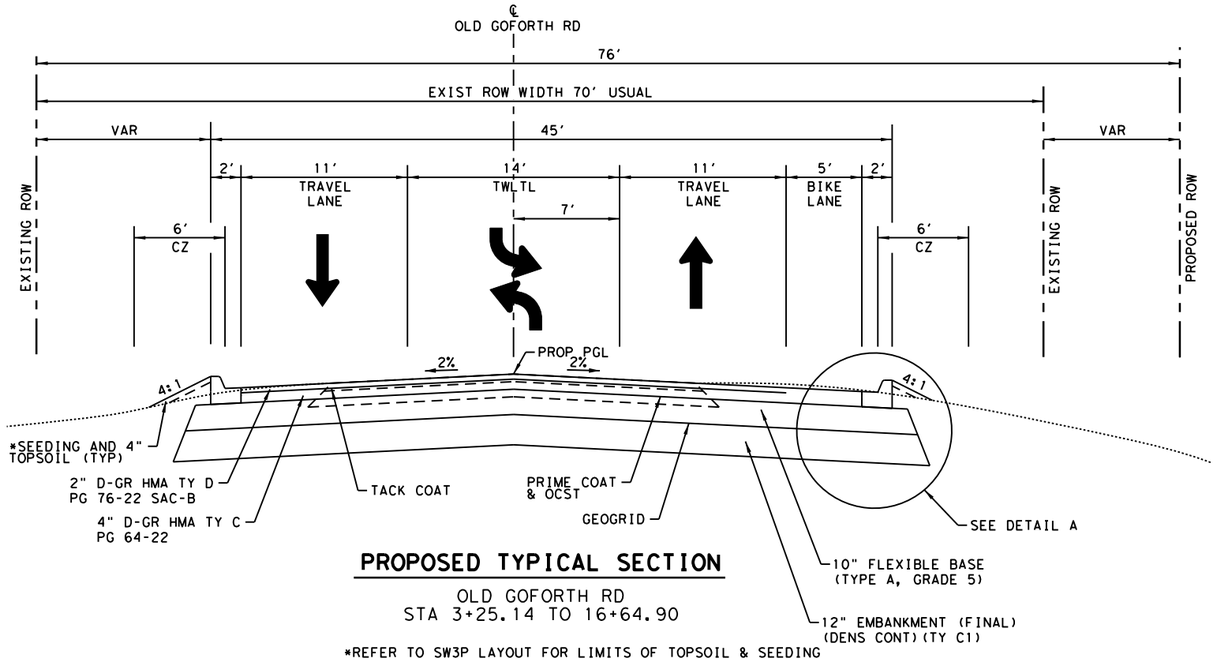
RATE OF APPLICATION:
HMA=110 LBS/SY/IN

TACK COAT=0.08 GAL/SY

OCST=
AC-10-2TR,AC-15P,OR CRS-2P@
0.4 GAL/SY
TY PB GR 3 @ 1 CY/85 SY

PRIME=
RC-250 @ 0.2 GAL/SY
TY E GR 5 @ 1 CY/140 SY

0 5 10
SCALE: 1"=10' H
1"=5' V



PROPOSED TYPICAL SECTION

OLD GOFORTH RD
STA 3+25.14 TO 16+64.90

*REFER TO SW3P LAYOUT FOR LIMITS OF TOPSOIL & SEEDING

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

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HILLSIDE TERRACE

PROPOSED TYPICAL SECTIONS

DESIGNED BY:		SHEET 4 OF 4
DRAWN BY:		11
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	502 6001	508 6001	512 6009	512 6010	512 6033	512 6034	512 6057	512 6058	662 6002	662 6004	662 6012	662 6016	662 6017	662 6029	662 6032
	BARRICADES, SIGNS AND TRAFFIC HANDLING	CONSTRUCTING DETOURS	PORT CTB (FUR & INST) (LOW PROF) (TY 1)	PORT CTB (FUR & INST) (LOW PROF) (TY 2)	PORT CTB (MOVE) (LOW PROF) (TY 1)	PORT CTB (MOVE) (LOW PROF) (TY 2)	PORT CTB (REMOVE) (LOW PROF) (TY 1)	PORT CTB (REMOVE) (LOW PROF) (TY 2)	WK ZN PAV MRK NON-REMOV (W) 4" (DOT)	WK ZN PAV MRK NON-REMOV (W) 4" (SLD)	WK ZN PAV MRK NON-REMOV (W) 8" (SLD)	WK ZN PAV MRK NON-REMOV (W) 24" (SLD)	WK ZN PAV MRK NON-REMOV (W) (ARROW)	WK ZN PAV MRK NON-REMOV (W) (WORD)	WK ZN PAV MRK NON-REMOV (Y) 4" (BRK)
	MO	SY	LF	LF	LF	LF	LF	LF	LF	LF	LF	LF	EA	EA	LF
PHASE 1															
STEP 1		1170	3020	140											
STEP 2				480	⚹ 3020	140		280							
STEP 3		280			⚹ 1110	⚹ 340									
PHASE 2															
STEP 1		120			1470	80			30	4490	240	12	6	4	550
STEP 2		380			⚹ 1470	80				1200	120		2	1	190
STEP 3					⚹ 290										
PHASE 3															
STEP 1		65			1120	80				2560	280	30	5	4	370
STEP 2					⚹ 1120	40									
STEP 3															
PHASE 4															
STEP 1			1120		1000	40	2500	220		500	60	30	1	1	
STEP 2					⚹ 1140	⚹ 120									
STEP 3															
PHASE 5															
STEP 1					1640	40	110								
STEP 2					1530	120	1530	120							
PROJECT TOTALS	20	2015	4140	620	14910	1080	4140	620	30	8750	700	72	14	10	1110

⚹ INCLUDES LOW PROFILE BARRIER (LF) TO BE MOVED TO TEMPORARY STORAGE AREA AND USED IN LATER PHASE.

SUMMARY OF WORKZONE TRAFFIC CONTROL ITEMS

LOCATION	662 6034	662 6061	662 6063	662 6071	662 6075	662 6080	662 6094	662 6095	662 6109	662 6111	677 6001	6001 6002	6185 6002	6185 6005
	WK ZN PAV MRK NON-REMOV (Y) 4" (SLD)	WK ZN PAV MRK REMOV (W) 4" (DOT)	WK ZN PAV MRK REMOV (W) 4" (SLD)	WK ZN PAV MRK REMOV (W) 8" (SLD)	WK ZN PAV MRK REMOV (W) 24" (SLD)	WK ZN PAV MRK REMOV (W) (ARROW)	WK ZN PAV MRK REMOV (Y) 4" (DOT)	WK ZN PAV MRK REMOV (Y) 4" (SLD)	WK ZN PAV MRK SHT TERM (TAB) TY W	WK ZN PAV MRK SHT TERM (TAB) TY Y-2	ELIM EXT PAV MRK & MRKS (4")	PORTABLE CHANGEABLE MESSAGE SIGN	TMA (STATIONARY)	TMA (MOBILE OPERATION)
	LF	LF	LF	LF	LF	EA	LF	LF	EA	EA	LF	EA	DAY	DAY
PHASE 1														
STEP 1			600					600			900	4		
STEP 2		440	6170	100	50	1	70	6130						
STEP 3			2380					2380						
PHASE 2														
STEP 1	2600		2620		12			4800	110	640				
STEP 2	800	60	3040		24		120	2780	24	244				
STEP 3														
PHASE 3														
STEP 1	2470		1920		12			1920	56	480		1		
STEP 2		100	1220				80	1220						
STEP 3														
PHASE 4														
STEP 1	880		1900					1900	12	90				
STEP 2			10400		12			10400	1330	2330				
STEP 3														
PHASE 5														
STEP 1		100	1650				100	1650						
STEP 2		100	1650				100	1650	36	760				
PROJECT TOTALS	6750	800	33550	100	110	1	470	35430	1568	4544	900	5	30	15

NOTE: WORK ZONE PAVEMENT MARKERS SHORT TERM (TABS) TO BE PLACED AFTER 4" HMA SURFACE & AFTER 2" HMA SURFACE

NO.	DATE	REVISION	APPROVED

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HILLSIDE TERRACE

SUMMARY OF TRAFFIC CONTROL QUANTITIES

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		12
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF ROADWAY ITEMS

LOCATION	100 6002	104 6009	104 6015	104 6017	104 6022	104 6032	106 6001	110 6001	132 6003	132 6025	247 6041	316 6029	316 6202	316 6222	316 6400	432 6001	529 6008
	PREPARING ROW	REMOVING CONC (RIPRAP)	REMOVING CONC (SIDEWALKS)	REMOVING CONC (DRIVEWAYS)	REMOVING CONC (CURB AND GUTTER)	REMOVING CONC (WHEELCHAIR RAMP)	OBLITERATING ABANDONED ROAD	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)	EMBANKMENT (FINAL) (DENS CONT) (TY C1)	FL BS (CMP IN PLC) (TYA GR1-2) (FNAL POS)	ASPH (RC-250)	AGGR (TY-E GR-5 SAC-B)	AGGR (TY-PB GR-3 SAC-B)	ASPH (AC-15P OR AC-10-2TR OR CRS-2P)	RIPRAP (CONC) (4 IN)	CONC CURB & GUTTER (TY II)
	STA	SY	SY	SY	LF	SY	STA	CY	CY	CY	CY	GAL	CY	CY	GAL	CY	LF
PP 01	2.68				1055	21	2.6	1667	3335	1892	763	505	19	33	1010		647
PP 02	5.50			68	659		0.7	2918	763	2596	1031	656	24	44	1312		1066
PP 03	5.50			11	958			3154	189	2395	948	595	22	41	1189		1103
PP 04	5.50	9		31	905			5043	53	2268	897	563	21	38	1125		1087
PP 05	5.50	158		23	1037			4085	156	2268	897	563	21	38	1125	8	1074
PP 06	5.50	81	40		1143			2746	164	1534	897	563	21	38	1125		1101
PP 07	5.50	333			500			2320	1278	1114	897	563	21	38	1125		1100
PP 08	5.50				1086			2544	95	1086	876	554	20	38	1108		1012
PP 09	5.50			92	2150			1539	133	997	800	492	18	34	984		1079
PP 10	5.50				1310		5.3	2393	407	1393	1130	730	27	48	1460		1097
PP 11	5.50	129		23	1092		5.4	1112	1052	1575	1281	839	30	55	1678		1101
PP 12	5.50				1093		5.2	5941	5	1644	1339	880	32	57	1760		1183
PP 13	5.50				1008		4.8	839	153	1644	1339	880	32	57	1760		1068
PP 14	5.50	291			1071		5.2	708	544	1644	1339	880	32	57	1760		1088
PP 15	5.50				1021		4.8	2580	1317	1644	1339	880	32	57	1760		1068
PP 16	5.50			10	975		4.4	1244	11370	1644	1339	880	32	57	1760		1034
PP 17	5.50	87			1039		5.2	8126	2	1644	1339	880	32	57	1760		1094
PP 18	3.43	351			909		3.2	2698	1	1068	870	571	21	37	1141		733
OLD GOFORTH PP 19	3.97				618			1285	11	660	529	322	12	23	644		769
OLD GOFORTH PP 20	5.50			191				2978	190	1000	802	494	18	34	988		1070
OLD GOFORTH PP 21	5.50	18		369				3090	66	1012	812	502	18	35	1003		1048
OLD GOFORTH PP 22	1.65	22						967	221	316	254	158	6	11	315		330
PROJECT TOTALS	110.73	1479	40	818	19629	21	46.7	59977	21505	33038	21718	13950	511	927	27892	8	21952

SUMMARY OF ROADWAY ITEMS (CONT.)

LOCATION	530 6002	530 6004	530 6005	531 6002	531 6009	531 6010	542 6001	542 6002	544 6003	560 6001	3076 6015	3076 6050	3076 6066	5001 6002
	INTERSECTIONS (ACP)	DRIVEWAYS (CONC)	DRIVEWAYS (ACP)	CONC SIDEWALKS (5")	CURB RAMPS (TY 6)	CURB RAMPS (TY 7)	REMOVE METAL BEAM GUARD FENCE	REMOVE TERMINAL ANCHOR SECTION	GUARDRAIL END TREATMENT (REMOVE)	MAILBOX INSTALL-S (TWG-POST) TY 1	D-GR HMA TY-C PG64-22	D-GR HMA TY-D SAC-B PG76-22	TACK COAT	GEOGRID BASE REINFORCEMENT (TY II)
	SY	SY	SY	SY	EA	EA	LF	EA	EA	EA	TON	TON	GAL	SY
PP 01						2					556	278	202	2774
PP 02		56	54								722	361	263	3766
PP 03		12									654	327	238	3464
PP 04	333	55	23							1	619	310	225	3280
PP 05		28	26				292	2	1	1	619	310	225	3280
PP 06	105		285		2					2	619	310	225	3280
PP 07							250	2	2		619	310	225	3280
PP 08	119		20								610	305	222	3200
PP 09		173	41								542	271	197	2929
PP 10			37				155	2	2		803	402	292	4118
PP 11		56					259	2	2		923	462	336	4662
PP 12	235		48	68	2					1	968	484	352	4869
PP 13			387							3	968	484	352	4869
PP 14			154				400				968	484	352	4869
PP 15			274								968	484	352	4869
PP 16		240	199								968	484	352	4869
PP 17			278								968	484	352	4869
PP 18			105								628	314	229	3163
OLD GOFORTH PP 19			23						1		354	177	129	1937
OLD GOFORTH PP 20		106					249	1			544	272	198	2939
OLD GOFORTH PP 21		192	21				329		1		552	276	201	2975
OLD GOFORTH PP 22							347		3		174	87	63	928
PROJECT TOTALS	792	918	1975	68	4	2	2281	9	12	8	15346	7676	5582	79189

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TBPE Registration No. F-1046

HILLSIDE TERRACE

SUMMARY OF ROADWAY QUANTITIES

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		13
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF EARTHWORK
HILLSIDE TERRACE

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
12+82.40	0	0
13+00.00	309	4
13+50.00	473	514
14+00.00	276	960
14+50.00	249	671
15+00.00	199	560
15+50.00	160	625
16+00.00	153	355
16+50.00	164	164
17+00.00	183	126
17+50.00	228	43
18+00.00	296	6
18+50.00	345	3
19+00.00	347	7
19+50.00	324	10
20+00.00	307	11
20+50.00	291	11
21+00.00	276	13
21+50.00	274	15
22+00.00	281	15
22+50.00	293	14
23+00.00	305	12
23+50.00	311	10
24+00.00	308	9
24+50.00	295	9
25+00.00	325	8
25+50.00	300	10
26+00.00	230	14
26+50.00	226	15
27+00.00	230	15
27+50.00	238	13
28+00.00	271	11
28+50.00	466	6
29+00.00	544	0
29+50.00	478	0
30+00.00	530	0
30+50.00	564	0
31+00.00	551	0
31+50.00	514	0
32+00.00	488	0
32+50.00	451	0
33+00.00	414	0
33+50.00	397	1
34+00.00	381	5
34+50.00	369	6
35+00.00	355	8
35+50.00	323	28
36+00.00	315	47
36+50.00	338	40
37+00.00	361	19
37+50.00	376	5
38+00.00	392	1
38+50.00	414	0
39+00.00	411	0
39+50.00	332	0
40+00.00	251	1
40+50.00	218	5
41+00.00	184	13
TOTAL	18884	4438

SUMMARY OF EARTHWORK
HILLSIDE TERRACE

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
41+50.00	165	22
42+00.00	145	28
42+50.00	118	35
43+00.00	94	55
43+50.00	79	88
44+00.00	87	129
44+50.00	105	178
45+00.00	152	213
45+50.00	219	189
46+00.00	266	148
46+50.00	293	139
47+00.00	301	148
47+50.00	287	169
48+00.00	259	134
48+50.00	237	64
49+00.00	209	32
49+50.00	169	20
50+00.00	138	19
50+50.00	128	18
51+00.00	163	8
51+50.00	526	0
52+00.00	581	0
52+50.00	301	0
53+00.00	311	0
53+50.00	295	0
54+00.00	221	0
54+50.00	152	3
55+00.00	109	10
55+50.00	91	12
56+00.00	101	10
56+50.00	131	8
57+00.00	179	5
57+50.00	211	9
58+00.00	184	16
58+50.00	132	24
59+00.00	106	34
59+50.00	97	40
60+00.00	83	44
60+50.00	58	190
61+00.00	60	212
61+50.00	131	58
62+00.00	237	23
62+50.00	318	17
63+00.00	359	16
63+50.00	364	14
64+00.00	323	15
64+50.00	274	18
65+00.00	222	22
65+50.00	152	30
66+00.00	85	73
66+50.00	42	241
67+00.00	31	376
67+50.00	29	345
68+00.00	34	241
68+50.00	44	151
69+00.00	63	99
69+50.00	117	48
70+00.00	253	22
TOTAL	10621	4262

SUMMARY OF EARTHWORK
HILLSIDE TERRACE

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
70+50.00	410	8
71+00.00	551	0
71+50.00	857	0
72+00.00	945	0
72+50.00	759	0
73+00.00	698	0
73+50.00	679	0
74+00.00	664	0
74+50.00	632	0
75+00.00	575	0
75+50.00	508	0
76+00.00	427	3
76+50.00	310	10
77+00.00	185	26
77+50.00	95	53
78+00.00	49	107
78+50.00	37	156
79+00.00	35	159
79+50.00	42	115
80+00.00	59	59
80+50.00	87	36
81+00.00	116	30
81+50.00	125	27
82+00.00	122	27
82+50.00	120	29
83+00.00	104	35
83+50.00	57	52
84+00.00	14	118
84+50.00	7	145
85+00.00	16	102
85+50.00	39	64
86+00.00	105	42
86+50.00	163	38
87+00.00	143	39
87+50.00	94	55
88+00.00	74	90
88+50.00	77	105
89+00.00	108	73
89+50.00	196	37
90+00.00	328	19
90+50.00	441	10
91+00.00	483	12
91+50.00	372	41
92+00.00	198	198
92+50.00	106	546
93+00.00	63	910
93+50.00	58	1050
94+00.00	56	994
94+50.00	37	942
95+00.00	23	969
95+50.00	14	1034
96+00.00	9	1105
96+50.00	13	1213
97+00.00	32	869
97+50.00	227	234
98+00.00	639	7
98+50.00	986	0
99+00.00	1198	0
TOTAL	15567	11993

SUMMARY OF EARTHWORK
HILLSIDE TERRACE

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
99+50.00	1362	0
100+00.00	1287	0
100+50.00	985	0
101+00.00	692	0
101+50.00	519	0
102+00.00	497	0
102+50.00	528	0
103+00.00	536	0
103+50.00	524	0
104+00.00	510	0
104+50.00	534	0
105+00.00	585	0
105+50.00	601	0
106+00.00	554	0
106+50.00	465	0
106+92.78	268	8
TOTAL	10447	8
PROJECT TOTAL	55519	20701

SUMMARY OF EARTHWORK
OLD GOFORTH ROAD

ITEM	110	132
DESCRIPTION	EXCAVATION (ROADWAY)	EMBANKMENT (FINAL) (ORD COMP) (TY B)
STATION	CY	CY
0+03.96	0	0
0+50.00	112	0
1+00.00	243	1
1+50.00	228	2
2+00.00	192	7
2+50.00	175	11
3+00.00	182	11
3+50.00	190	11
4+00.00	209	11
4+50.00	233	30
5+00.00	259	56
5+50.00	278	52
6+00.00	270	31
6+50.00	261	14
7+00.00	272	4
7+50.00	285	1
8+00.00	300	0
8+50.00	315	0
9+00.00	309	5
9+50.00	293	12
10+00.00	281	12
10+50.00	271	14
11+00.00	266	8
11+50.00	255	0
12+00.00	238	1
12+50.00	228	2
13+00.00	233	2
13+50.00	251	1
14+00.00	253	2
14+50.00	241	3
15+00.00	236	3
15+50.00	234	63
16+00.00	235	99
16+50.00	236	43
16+64.90	56	1
TOTAL	8120	513

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

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Tel: 512-879-0400 • www.bgeinc.com
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HILLSIDE TERRACE

SUMMARY OF EARTHWORK QUANTITIES

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		14
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF CROSS CULVERT ITEMS

LOCATION	104	110	400	402	432	432	462	462	462	462	462	464	464	466	466	466	466	466	466
	6009	6002	6005	6001	6001	6033	6003	6007	6008	6014	6018	6025	6005	6095	6097	6180	6181	6182	6184
	REMOVING CONC (RIPRAP)	EXCAVATION (CHANNEL)	CEM STABIL BKFL	TRENCH EXCAVATION PROTECTION	RIPRAP (CONC) (4 IN)	RIPRAP (STONE PROTECTION) (18 IN)	CONC BOX CULV (4 FT X 2 FT)	CONC BOX CULV (5 FT X 3 FT)	CONC BOX CULV (5 FT X 4 FT)	CONC BOX CULV (7 FT X 3 FT)	CONC BOX CULV (7 FT X 7 FT)	RC PIPE (CL V) (18 IN)	RC PIPE (CL III) (24 IN)	HEADWALL (CH - PW - 0) (DIA= 18 IN)	HEADWALL (CH - PW - 0) (DIA= 24 IN)	WINGWALL (PW - 1) (HW=5 FT)	WINGWALL (PW - 1) (HW=6 FT)	WINGWALL (PW - 1) (HW=7 FT)	WINGWALL (PW - 1) (HW=9 FT)
	SY	CY	CY	LF	CY	CY	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
CULVERT 1																			
CULVERT 2			21		2							61		2					
CULVERT 3		539	76			56				156	27					1			1
CULVERT 4			263	28	7	44		277									2		
CULVERT 5			265	15		48			280									2	
CULVERT 7	122		144	97	2		253												
CULVERT 9					3	13							20		1				
PROJECT TOTALS	122	539	769	140	14	161	253	277	280	156	27	61	20	2	1	1	2	2	1

SUMMARY OF CROSS CULVERT ITEMS (CONTINUED)

LOCATION	466	467	496	496	496
	6214	6142	6001	6006	6016
	HEADWALL (CH - PW - 0) (DIA= 24 IN) (MOD)	SET (TY I) (S= 4 FT) (HW= 3 FT) (6:1) (P)	REMOV STR (BOX CULVERT)	REMOV STR (HEADWALL)	REMOV STR (PIPE)
	EA	EA	EA	EA	EA
CULVERT 1					
CULVERT 2					1
CULVERT 3			1		1
CULVERT 4			1		
CULVERT 5			1		
CULVERT 7		4	1		
CULVERT 9	1			2	
PROJECT TOTALS	1	4	4	2	2

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HILLSIDE TERRACE

SUMMARY OF DRAINAGE QUANTITIES

DESIGNED BY:		SHEET 1 OF 2
DRAWN BY:		15
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF STORM SEWER ITEMS

STORM SEWER P&P SHEET #	104 6009 REMOVING CONC (RIPRAP) SY	402 6001 TRENCH EXCAVATION PROTECTION LF	432 6033 RIPRAP (STONE PROTECTION) (18 IN) CY	462 6001 CONC BOX CULV (3 FT X 2 FT) LF	462 6002 CONC BOX CULV (3 FT X 3 FT) LF	462 6004 CONC BOX CULV (4 FT X 3 FT) LF	462 6005 CONC BOX CULV (4 FT X 4 FT) LF	464 6003 RC PIPE (CL III) (18 IN) LF	464 6005 RC PIPE (CL III) (24 IN) LF	464 6008 RC PIPE (CL III) (36 IN) LF	465 6022 INLET (COMPL) (PCO) (5FT) (LEFT) EA	465 6023 INLET (COMPL) (PCO) (5FT) (RIGHT) EA	465 6024 INLET (COMPL) (PCO) (5FT) (BOTH) EA	465 6037 INLET (COMPL) (PCU) (5FT) (NONE) EA	465 6038 INLET (COMPL) (PCU) (5FT) (LEFT) EA	465 6039 INLET (COMPL) (PCU) (5FT) (RIGHT) EA	465 6062 INLET (COMPL) (PSL) (RH) (3FTX3FT) EA	465 6063 INLET (COMPL) (PSL) (RH) (4FTX4FT) EA	465 6068 INLET (COMPL) (PSL) (RH) (6FTX6FT) EA	465 6158 INLET (COMPL) (PAZD) (FG) (3FTX3FT-3FTX3FT) EA
1	15																			
2	89	555			67	86	343	252	165	123	1	2	3	1	2	1	1		3	1
3	204	88						350	401	83		2			2		1	1		2
4		589						689				1			1		2			1
5		53						298			1	1								
6								127			1	1								
7		354						640	100		4	4	2							
8	103							375			2	2					1			
9								286			2	1								
10		325						539	17		4	2								
11								356	370		3	3	2							
12		514						152	428		2	2								
13																				
14								228	169		2	2	2							
15																				
16		96						528			3	2								
17		708						242	442		2	2					3			
18		450						229	297		2	3	1							
19								66			1	1								
20		450	10	21				620	85		3	5	2							
21								425			2	3	2							
22								77			1	1								
PROJECT TOTALS	411	4182	10	21	67	86	343	6479	2474	206	36	40	14	1	5	1	8	1	3	4

SUMMARY OF STORM SEWER ITEMS (CONTINUED)

STORM SEWER P&P SHEET #	465 6160 INLET (COMPL) (PAZD) (FG) (4FTX4FT-4FTX4FT) EA	466 6097 HEADWALL (CH - PW - O) (DIA= 24 IN) EA	466 6178 WINGWALL (PW - 1) (HW=3 FT) EA	466 6180 WINGWALL (PW - 1) (HW=5 FT) EA	467 6359 SET (TY II) (18 IN) (RCP) (4: 1) (P) EA	467 6391 SET (TY II) (24 IN) (RCP) (4: 1) (P) EA	496 6002 REMOV STR (INLET) EA	496 6003 REMOV STR (MANHOLE) EA	496 6004 REMOV STR (SET) EA	496 6007 REMOV STR (PIPE) LF	496 6016 REMOV STR (PIPE) EA	496 6023 REMOVE STR (JUNCTION BOX) EA
1							1		1	10		
2	1			1	1	1	2		2	720		1
3	2						4	1		681		
4	1						2	1		170		
5												
6												
7		1						1		389		
8							2			409		
9												
10		1										
11		2										
12												
13												
14		1									1	
15												
16												
17												
18						1						
19												
20			1								1	
21												
22					1							
PROJECT TOTALS	4	5	1	1	2	2	11	3	3	2379	2	1

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HAYS COUNTY STATE OF TEXAS

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TBPE Registration No. F-1046

HILLSIDE TERRACE

SUMMARY OF DRAINAGE QUANTITIES

DESIGNED BY:		SHEET 2 OF 2
DRAWN BY:		16
CHECKED BY:		
APPROVED BY:		

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SUMMARY OF PAVEMENT MARKING ITEMS													
LOCATION	**666** 6018	**666** 6036	**666** 6306	**666** 6309	**666** 6318	**666** 6321	**668** 6076	**668** 6077	**668** 6085	**668** 6094	**668** 6096	**672** 6007	**672** 6009
	REFL PAV MRK TY I (W)6"(DOT)(100MIL)	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (W)6"(SLD)(100MIL)	RE PM W/RET REQ TY I (Y)6"(BRK)(100MIL)	RE PM W/RET REQ TY I (Y)6"(SLD)(100MIL)	PREFAB PAV MRK TY C (W) (24") (SLD)	PREFAB PAV MRK TY C (W) (ARROW)	PREFAB PAV MRK TY C (W) (WORD)	PREFAB PAV MRK TY C (W)(BIKE ARROW)	PREFAB PAV MRK TY C (W)(BIKE SYMBOL)	REFL PAV MRKR TY I-C	REFL PAV MRKR TY II-A-A
	LF	LF	LF	LF	LF	LF	LF	EA	EA	EA	EA	EA	EA
SPMD 01	20	120		2107	105	1578	159	4	3	1	1	6	41
SPMD 02		120		2067	351	2122	62	2	1			6	72
SPMD 03		120		2200	362	2264	12	2	1			6	77
SPMD 04		210		2050	282	2344	102	3	3	4	4	11	93
SPMD 05			123	2202	310	2932							102
SPMD 06		120	447	2200	368	2268	12	4	1			6	80
SPMD 07			550	2200	550	2200							55
SPMD 08			550	2200	550	2200							55
SPMD 09	8	120	394	1655	387	1888	29	4	2	1	1	12	56
OLD GOFORTH SPMD 01	26	177		896	316	2066		4	2	1	1	9	68
OLD GOFORTH SPMD 02				715	358	1430							36
PROJECT TOTALS	54	987	2064	20492	3939	23292	376	23	13	7	7	56	735

SUMMARY OF SIGNING ITEMS										
LOCATION	**636** 6001	**644** 6001	**644** 6002	**644** 6033	**644** 6034	**644** 6076	**658** 6047	**682** 6021	**682** 6048	**685** 6004
	ALUMINUM SIGNS (TY A)	IN SM RD SN SUP&AM TY10BWG(1)SA(P)	IN SM RD SN SUP&AM TY10BWG(1)SA(P-BM)	IN SM RD SN SUP&AM TYS80(1)SA(U)	IN SM RD SN SUP&AM TYS80(1)SA(U-1EXT)	REMOVE SM RD SN SUP&AM	INSTL OM ASSM (OM-2Y)(WC)GND	BACK PLATE (12") (1 SEC)	VEH SIG SEC (12")(LED)(YEL)(SOLAR)	INSTL RDSD FLSH BCN ASSM (SOLAR PWRD)
	SF	EA	EA	EA	EA	EA	EA	EA	EA	EA
SPMD 01		3	4		1	6				
SPMD 02		3	3	1		5				
SPMD 03		5	1			4	2			
SPMD 04		5	4	1		9	2			
SPMD 05		1					2			
SPMD 06		4	1			1	4			
SPMD 07										
SPMD 08										
SPMD 09		4	1			4	2			
OLD GOFORTH SPMD 01		4				1				
OLD GOFORTH SPMD 02	11	2					2	2	2	1
PROJECT TOTALS	11	31	14	2	1	30	14	2	2	1

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TBPE Registration No. F-1046

HILLSIDE TERRACE

SUMMARY OF SIGNING AND PAVEMENT MARKING QUANTITIES

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		
CHECKED BY:		17
APPROVED BY:		

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	TYPE S
1	1	R1-1	STOP	36 X 36	X		10BWG	1	SA	P	BM		
		R1-3P	ALL WAY	18 X 6	X								
1	2	R1-1	STOP	36 X 36	X		10BWG	1	SA	P	BM		
		R1-3P	ALL WAY	18 X 6	X								
1	3	R3-5R	INTERSECTION LANE CONTROL	30 X 36	X		10BWG	1	SA	P			
1	4	R2-1	SPEED LIMIT 30	30 X 36	X		10BWG	1	SA	P			
1	5	M3-4B	WEST	24 X 12	X		S80	1	SA	U	1 EXT		
		M1-5	HAYS COUNTY 132	24 X 24	X								
		M6-3B	↑	21 X 15	X								
		M3-3B	SOUTH	24 X 12	X								
		M1-1 T	INTERSTATE 35	24 X 24	X								
		M6-3B	↑	21 X 15	X								
		M3-1B	NORTH	24 X 12	X								
		M1-1 T	INTERSTATE 35	24 X 24	X								
		M5-1R(B)	↱	21 X 15	X								
1	6	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	DENISE ELLEN DR	42 X 8	X								
		R1-1	STOP	36 X 36	X								
1	7	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	LOVE DR	30 X 8	X								
		R1-1	STOP	36 X 36	X								
1	8	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
2	1	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	SUSAN DR	30 X 8	X								
		R1-1	STOP	36 X 36	X								
2	2	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	REGINA DR	36 X 8	X								
		R1-1	STOP	36 X 36	X								
2	3	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
2	4	W1-10	CHEVRON / LARGE ARROW	96 X 36	X		S80	1	SA	U			
2	5	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	DACY LN	30 X 8	X								
		R1-1	STOP	36 X 36	X								
2	6	W7-6	LIMITED SIGHT DISTANCE	36 X 36	X		10BWG	1	SA	P			
2	7	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
3	1	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
3	2	W2-2L	INTERSECTION AHEAD	30 X 30	X		10BWG	1	SA	P			
3	3	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	SHELLSTONE TRAIL	42 X 8	X								
		R1-1	STOP	36 X 36	X								

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 1 OF 3

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		18

18

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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	MOUNTING DESIGNATION 1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE S
3	4	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
3	5	W7-6	LIMITED SIGHT DISTANCE	36 X 36	X		10BWG	1	SA	P			
3	6	W2-2R	INTERSECTION AHEAD	30 X 30	X		10BWG	1	SA	P			
4	1	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
4	2	R2-1	SPEED LIMIT 30	30 X 36	X		10BWG	1	SA	P			
4	3	M1-5	HAYS COUNTY 133	24 X 24	X		10BWG	1	SA	P			
4	4	D3-1	OLD GOFORTH RD	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	HILLSIDE TERRACE	42 X 8	X								
		R1-1	STOP	36 X 36	X								
		R1-3P	ALL WAY	18 X 6	X								
4	5	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	TORI DR	24 X 8	X								
		R1-1	STOP	36 X 36	X								
		R1-3P	ALL WAY	18 X 6	X								
4	6	W14-2	NO OUTLET	30 X 30	X		10BWG	1	SA	P			
4	7	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	OLD GOFORTH RD	42 X 8	X								
		R1-1	STOP	36 X 36	X								
		R1-3P	ALL WAY	18 X 6	X								
4	8	D3-1	TORI DR	24 X 8	X		10BWG	1	SA	P	BM		
		D3-1	HILLSIDE TERRACE	42 X 8	X								
		R1-1	STOP	36 X 36	X								
		R1-3P	ALL WAY	18 X 6	X								
4	9	D24-2TL	TOM GREEN SCHOOL	66 X 36	X		S80	1	SA	U			
4	10	R2-1	SPEED LIMIT 30	30 X 36	X		10BWG	1	SA	P			
5	1	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
6	1	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
6	2	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	GREEN MEADOWS LN	48 X 8	X								
		R1-1	STOP	36 X 36	X								
6	3	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
6	4	W9-2TL	LANE ENDS MERGE LEFT	36 X 36	X		10BWG	1	SA	P			
6	5	W9-1R	RIGHT LANE ENDS	36 X 36	X		10BWG	1	SA	P			
9	1	W3-1a	STOP AHEAD	30 X 30	X		10BWG	1	SA	P			
9	2	R2-1	SPEED LIMIT 30	30 X 36	X		10BWG	1	SA	P			
9	3	M1-5	HAYS COUNTY 133	24 X 24	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

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NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 2 OF 3

FILE: sums16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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SUMMARY OF SMALL SIGNS

SM RD SGN ASSM TY XXXXX (X) XX (X-XXXX)

PLAN SHEET NO.	SIGN NO.	SIGN NOMENCLATURE	SIGN	DIMENSIONS	FLAT ALUMINUM (TYPE A)	EXAL ALUMINUM (TYPE G)	POST TYPE FRP = Fiberglass TWT = Thin-Wall 10BWG = 10 BWG S80 = Sch 80	POSTS 1 or 2	ANCHOR TYPE UA=Universal Conc UB=Universal Bolt SA=Slipbase-Conc SB=Slipbase-Bolt WS=Wedge Steel WP=Wedge Plastic	MOUNTING DESIGNATION PREFABRICATED P = "Plain" T = "T" U = "U"	1EXT or 2EXT = # of Ext BM = Extruded Wind Beam WC = 1.12 #/ft Wing Channel EXAL= Extruded Alum Sign Panels	BRIDGE MOUNT CLEARANCE SIGNS (See Note 2) TYPE N	TYPE S
9	4	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
9	5	D3-1	HILLSIDE TERRACE	42 X 8	X		10BWG	1	SA	P	BM		
		D3-1	FM 2001	30 X 8	X								
		R1-1	STOP	36 X 36	X								
10	1		HANDS FREE DEVICES ONLY (RE-USE EXISTING SIGN FACE)	24 X 36	X		10BWG	1	SA	P			
10	2	M1-5	HAYS COUNTY 119	24 X 24	X		10BWG	1	SA	P			
10	3	R3-7R	RIGHT LANE MUST TURN RIGHT	36 X 36	X		10BWG	1	SA	P			
10	4	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			
11	1	S5-1	SCHOOL SPEED LIMIT 20 WHEN FLASHING	24 X 48	X				ITEM 685: ROADSIDE FLASHING BEACON ASSEMBLIES				
		S7-1T	CELL PHONE USE PROHIBITED UP TO $200 FINE	24 X 18	X								
11	2	S5-2	END SCHOOL ZONE	24 X 30	X		10BWG	1	SA	P			
11	3	R3-9b	CENTER LANE ONLY	24 X 36	X		10BWG	1	SA	P			

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080"
7.5 to 15	0.100"
Greater than 15	0.125"

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

NOTE:

1. Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.
2. For installation of bridge mount clearance signs, see Bridge Mounted Clearance Sign Assembly (BMCS)Standard Sheet.
3. For Sign Support Descriptive Codes, see Sign Mounting Details Small Roadside Signs General Notes & Details SMD(GEN).

Texas Department of Transportation

Traffic Operations Division Standard

SUMMARY OF SMALL SIGNS

SOSS

SHEET 3 OF 3

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SUMMARY OF EROSION CONTROL ITEMS														
LOCATION	160	164	164	164	166	168	506	506	506	506	506	506	506	506
	6003	6035	6041	6043	6001	6001	6002	6011	6020	6024	6038	6039	6041	6043
	FURNISHING AND PLACING TOPSOIL (4")	DRILL SEEDING (PERM) (RURAL) (CLAY)	DRILL SEEDING (TEMP) (WARM)	DRILL SEEDING (TEMP) (COOL)	FERTILIZER	VEGETATIVE WATERING	ROCK FILTER DAMS (INSTALL) (TY 2)	ROCK FILTER DAMS (REMOVE)	CONSTRUCTION EXITS (INSTALL) (TY 1)	CONSTRUCTION EXITS (REMOVE)	TEMP SEDMT CONT FENCE (INSTALL)	TEMP SEDMT CONT FENCE (REMOVE)	BIODEG EROSN CONT LOGS (INSTL) (12")	BIODEG EROSN CONT LOGS (REMOVE)
	SY	SY	SY	SY	AC	MG	LF	LF	SY	SY	LF	LF	LF	LF
SW3P Layout (1 of 14)	3088	3088	1544	1544	0.7	62	22	22			1219	1219	190	190
SW3P Layout (2 of 14)	2083	2083	1042	1042	0.5	42					800	800	208	208
SW3P Layout (3 of 14)	5154	5154	2577	2577	1.1	104	12	12			481	481	152	152
SW3P Layout (4 of 14)	10541	10541	5271	5271	2.2	211	56	56			861	861	178	178
SW3P Layout (5 of 14)	3095	3095	1548	1548	0.7	62					115	115	36	36
SW3P Layout (6 of 14)	4925	4925	2463	2463	1.1	99	46	46			535	535	106	106
SW3P Layout (7 of 14)	5003	5003	2502	2502	1.1	101	48	48			532	532	72	72
SW3P Layout (8 of 14)	4910	4910	2455	2455	1.1	99					80	80	48	48
SW3P Layout (9 of 14)	8487	8487	4244	4244	1.8	170	16	16			1030	1030	82	82
SW3P Layout (10 of 14)	8139	8139	4070	4070	1.7	163					1100	1100	60	60
SW3P Layout (11 of 14)	5229	5229	2615	2615	1.1	105							48	48
SW3P Layout (12 of 14)	4614	4614	2307	2307	1.0	93	10	10			324	324	77	77
SW3P Layout (13 of 14)	2749	2749	1375	1375	0.6	55	18	18			808	808	130	130
SW3P Layout (14 of 14)	2758	2758	1379	1379	0.6	56	23	23			645	645	118	118
PROJECT TOTALS	70775	70775	35392	35392	15	1422	251	251	78	78	8530	8530	1505	1505

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
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1/27/2023

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
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HILLSIDE TERRACE

SUMMARY OF SW3P QUANTITIES

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		21
CHECKED BY:		
APPROVED BY:		

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CONSTRUCTION PHASES:

(PHASE 1 - STEP 1) TWO LANE TWO WAY TRAFFIC
(PHASE 1 - STEP 2) TWO LANE TWO WAY TRAFFIC

(PHASE 2 - STEP 1) ONE LANE ONE DIRECTION TRAFFIC (WESTBOUND TRAFFIC ONLY - DETOUR FOR EASTBOUND TRAFFIC)
(PHASE 2 - STEP 2) TWO LANE TWO WAY TRAFFIC

(PHASE 3 - STEP 1) ONE LANE ONE DIRECTION TRAFFIC (WESTBOUND TRAFFIC ONLY - DETOUR FOR EASTBOUND TRAFFIC)
(PHASE 3 - STEP 2) ONE LANE ONE DIRECTION TRAFFIC (WESTBOUND TRAFFIC ONLY - DETOUR FOR EASTBOUND TRAFFIC)

(PHASE 4 - STEP 1) CONSTRUCT WITHOUT IMPACT TO EXISTING ROADWAY
(PHASE 4 - STEP 2) TWO LANE TWO WAY TRAFFIC

(PHASE 5 - STEP 1 OLD GOFORTH ROAD) ONE LANE ONE DIRECTION TRAFFIC (SOUTHBOUND TRAFFIC ONLY - DETOUR FOR NORTHBOUND TRAFFIC)
(PHASE 5 - STEP 2 OLD GOFORTH ROAD) ONE LANE ONE DIRECTION TRAFFIC (SOUTHBOUND TRAFFIC ONLY - DETOUR FOR NORTHBOUND TRAFFIC)

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HILLSIDE TERRACE

TCP OVERVIEW

DESIGNED BY:		SHEET 1 OF 1
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APPROVED BY:		

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TRAFFIC CONTROL GENERAL NOTES

1. THE CONTRACTOR MAY SUBMIT AN ALTERNATE TRAFFIC CONTROL PLAN, SIGNED AND SEALED BY A LICENSED PROFESSIONAL ENGINEER IN TEXAS, FOR APPROVAL.

2. VERIFY THE LOCATION AND SPACING OF SIGNS, BARRICADES, AND CHANNELIZING DEVICES PRIOR TO THEIR PLACEMENT ALONG VERTICAL CURVES, HORIZONTAL CURVES, AND OTHER GEOMETRIC CONSTRAINTS TO ENSURE VISIBILITY TO ALL MOTORISTS.

3. COVER, RELOCATE OR REMOVE EXISTING SIGNS THAT CONFLICT WITH THE TRAFFIC CONTROL PLAN AND UNCOVER DURING NON-WORKING HOURS OR AS DIRECTED BY THE ENGINEER. PARTIAL COVERAGE OF THE SIGN IS NOT PERMITTED. INSTALL ALL PERMANENT SIGNS, DELINEATION, AND OBJECT MARKERS REQUIRED FOR THE OPERATION OF THE ROADWAY BEFORE OPENING TO TRAFFIC. USE OF TEMPORARY MOUNTS IS ALLOWED OR MAY BE REQUIRED UNTIL THE PERMANENT MOUNTS ARE INSTALLED OR NOT IMPACTED BY CONSTRUCTION. MAINTAIN THE TEMPORARY MOUNTS. THIS WORK IS SUBSIDIARY.

4. THE CONTRACTOR IS TO ENSURE THAT ALL TRAFFIC CONTROL DEVICES AND WORK ZONE PAVEMENT MARKINGS ARE KEPT IN A HIGHLY VISIBLE CONDITION (CLEAN, UPRIGHT AND AT PROPER LOCATION).

5. CONDUCT CONSTRUCTION OPERATIONS SO AS TO PROVIDE THE LEAST POSSIBLE INTERFERENCE TO TRAFFIC AND TO PERMIT THE CONTINUOUS MOVEMENT OF TRAFFIC IN ALL ALLOWABLE DIRECTIONS AT ALL TIMES OR AS PERMITTED BY THE SEQUENCE OF CONSTRUCTION. PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ABUTTING PROPERTY, DRIVEWAYS AND SIDE STREET CROSSINGS.

6. PLACE ALL STOCKPILED MATERIAL, WASTE MATERIAL, SIGNS, BARRICADES, CHANNELIZING DEVICES AND WORK VEHICLES NOT IN USE, AT A MINIMUM OF 30 FEET FROM THE OUTER EDGE OF THE NEAREST TRAVEL LANE, (UNLESS PROTECTED BY A BARRIER).

7. MAINTAIN ALL EXISTING DRAINAGE CONDITIONS DURING ALL CONSTRUCTION PHASES UNTIL THE PERMANENT DRAINAGE FACILITIES ARE CONSTRUCTED AND READY TO USE. HANDLE EXCAVATED AND STOCKPILED MATERIAL IN SUCH A WAY THAT IT WILL NOT BLOCK DRAINAGE.

8. REGULATE ALL CONSTRUCTION TRAFFIC SO AS TO CAUSE A MINIMAL INCONVENIENCE TO THE TRAVELING PUBLIC. AT THE TIMES WHEN IT IS NECESSARY FOR TRUCKS TO STOP, UNLOAD OR CROSS ROADWAYS UNDER TRAFFIC, PROVIDE WARNING SIGNS AND FLAGGERS AS NEEDED TO ADEQUATELY PROTECT THE TRAVELING PUBLIC.

9. REMOVE FROM THE WORK AREA ALL LOOSE MATERIALS AND DEBRIS RESULTING FROM CONSTRUCTION OPERATIONS AT THE END OF EACH WORK DAY.

10. IMPLEMENT ALL REQUIRED EROSION CONTROL MEASURES AS SHOWN IN THE PLANS DURING THE VARIOUS STAGES OF CONSTRUCTION.

11. MOVING AN EXISTING SIGN TO A TEMPORARY LOCATION IS SUBSIDIARY TO THE VARIOUS BID ITEMS.

12. ADDITIONAL SIGNS, BARRICADES AND CHANNELIZING DEVICES MAY BE REQUIRED TO MAINTAIN TRAFFIC DURING CONSTRUCTION, AS SHOWN ON TCP STANDARDS. ADDITIONAL SIGNS, BARRICADES, ETC. (IF ANY), WILL BE SUBSIDIARY TO ITEMS 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING".

13. USE PLASTIC DRUMS TO CHANNELIZE TRAFFIC WHEN EXISTING PAVEMENT MARKINGS HAVE BEEN OBLITERATED.

14. SHADOW VEHICLE WITH TMA IS REQUIRED AS SHOWN IN THE TCP SHEETS AND FOR SETUP / REMOVAL OF TRAFFIC CONTROL DEVICES.

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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN GENERAL NOTES

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APPROVED BY:		

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TRAFFIC CONTROL PLAN NARRATIVE

GENERAL:

FOLLOW THE CONSTRUCTION SEQUENCING UNLESS OTHERWISE APPROVED.

THE CONTRACTOR MAY PROPOSE MODIFICATIONS TO THE SEQUENCE OF WORK FOR CONSIDERATION BY THE CONSTRUCTION OBSERVER. ANY RECOMMENDATION RESULTING IN MAJOR MODIFICATIONS TO THE SEQUENCE OF WORK BY THE CONTRACTOR SHALL INCLUDE ANY CHANGES TO THE VARIOUS PAY ITEMS, IMPACT TO TRAFFIC, AND EFFECT TO OVERALL PROJECT TIME, COST, ETC. DO NOT PROCEED WITH ANY CONSTRUCTION OPERATIONS BASED ON A REVISED SEQUENCE OF WORK WITHOUT WRITTEN APPROVAL FROM THE CONSTRUCTION OBSERVER.

IT IS THE CONTRACTOR'S RESPONSIBILTY TO DETERMINE EXACT LOCATION OF UTILITIES PRIOR TO STARTING CONSTRUCTION.

CONTRACTOR WILL MAINTAIN ACCESS TO DRIVEWAYS AND SIDE STREETS AT ALL TIMES UNLESS APPROVED BY THE CONSTRUCTION OBSERVER OR SHOWN OTHERWISE IN THE PLANS.

SIDE STREETS AND DRIVEWAYS CAN BE CONSTRUCTED UTILIZING DAILY/TEMPORARY ONE WAY TRAFFIC CONTROL AND BE OPENED TO FULL WIDTH AT THE END OF THE WORKDAY MAINTAINING ACCESS AT ALL TIMES UNLESS APPROVED BY THE CONSTRUCTION OBSERVER.

CONTRACTOR WILL BE RESPONSIBLE FOR MAINTENANCE OF FLEX BASE EXPOSED TO TRAFFIC.

CONTRACTOR WILL MAINTAIN DRAINAGE THROUGHOUT THE PROJECT.

TRAFFIC CONTROL ALIGNMENTS ARE OFFSET FROM PROPOSED CENTERLINE OF HILLSIDE TERRACE. SEE TRAFFIC CONTROL TYPICAL SECTIONS AND LAYOUTS FOR DIMENSIONS AND DETAILS.

INSTALL APPROPRIATE ADVANCE WARNING SIGNS AND TRAFFIC CONTROL DEVICES IN ACCORDANCE WITH ADVANCE WARNING LAYOUT, TXDOT STANDARDS BC(1)-21 THRU BC(12)-21, WZ(RS)-22, WZ(STPM)-13, WZ(UL)-13, TCP (2-1)-18, AND TCP (2-2)-18, PRIOR TO COMMENCING WORK.

PHASE 1 - STEP 1 CONSTRUCTION - STA 12+82 TO STA 39+50:

1. INSTALL PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS) AT THE BEGINNING AND END OF PROJECT TO ADVISE TRAFFIC OF CONSTRUCTION.

2. INSTALL TEMPORARY EROSION CONTROL DEVICES FOR CONSTRUCTION ACTIVITIES AS SHOWN ON SW3P LAYOUTS.

3. EXISTING TRAFFIC TO REMAIN ON EXISITNG LANES FOR PHASE 1 STEP 1.

4. REMOVE EXISTING CULVERT & CONSTRUCT COMPLETE LENGTH OF PROPOSED CULVERT 02. TEMPORARILY CONSTRUCT LEFT SIDE OF THE CULVERT 2' LONGER TO ACCOMMODATE TEMPORARY PAVEMENT FOR PHASE 1 STEP 2 TCP LANES. REMOVE THE 2' AND COMPLETE HEADWALL IN PHASE 1 STEP 3 CONSTRUCTION. CONSTRUCT CULVERT 02 IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC. CONSTRUCT STORM SEWER TRUNKLINE (LEFT SIDE), INLETS AND PARTIAL LATERALS. LATERALS TO BE CONSTRUCTED, CAPPED & COMPLETED IN PHASE 1 STEP 2. INLETS CONSTRUCTED IN PHASE 1 STEP 1 TO BE OPEN FOR PROJECT DRAINAGE.

5. REMOVE EXISTING CURB & GUTTER (LT SIDE) FROM STA 12+82 TO 44+00 AND BACKFILL PRIOR TO INSTALLING LPCB. REMOVAL OF EXISTING CURB & GUTTER AND BACKFILLING TO BE DONE USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ALL LANES TO BE OPEN AT THE END OF THE WORK DAY.

6. EXCAVATE AND REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA, EXCEPT CURB & GUTTER FROM STA 32+30 TO 39+50 TO BE CONSTRUCTED IN PHASE 1 STEP 3. CONSTRUCT SHELLSTONE TRAIL FULL DEPTH HMA IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. SEE MISCELLANEOUS DETAILS PLAN SHEET FOR ADDITIONAL INFORMATION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO SHELLSTONE TRAIL AT ALL TIMES. FINAL HMA SURFACE FOR HILLSIDE TERRACE & SHELLSTONE TRAIL TO BE CONSTRUCTED IN LATER PHASE. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

7. CONSTRUCT TEMPORARY PAVEMENT AND DRAINAGE DITCH IN ACCORDANCE WITH ITEM 508 FROM STA 32+30 TO 43+30 FOR PHASE 1 STEP 2 TRAFFIC LANES.
   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMAC GRADE TO EXISTING GRADE USING HMAC OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

8. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 STEP 1, CONSTRUCT WORK ZONE PAVEMENT MARKINGS FOR PHASE 1 STEP 2 TRAFFIC LANES. THEN PROCEED TO PHASE 1 STEP 2 CONSTRUCTION.

PHASE 1 - STEP 2 CONSTRUCTION - STA 12+82 TO STA 39+50:

1. AFTER COMPLETION OF PHASE 1 STEP 1, MOVE LPCB AND TRAFFIC CONTROL DEVICES ALONG RIGHT SIDE OF PHASE 1 STEP 2 TRAFFIC LANES AND LPCB ALONG LEFT SIDE FROM STA 35+00 TO 36+20 (CULVERT 02 LOCATION).

2. COMPLETE CULVERT 02 HEADWALL CONSTRUCTION (RT SIDE). REMOVE EXISTING STORM SEWER TRUNKLINES, LATERALS, MANHOLES, INLETS, ETC. COMPLETE PROPOSED STORM SEWER LATERALS & INLETS. COMPLETE LATERALS FROM PHASE 1 STEP 1 CONSTRUCTION. ALL INLETS TO BE OPENED FOR DRAINAGE AFTER COMPLETION OF STORM SEWER SYSTEM.

3. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA FROM STA 12+82 TO 13+50. THEN MOVE LPCB TO ALLOW RIGHT TURNS FROM IH 35 FRONTAGE ROAD ONTO HILLSIDE TERRACE. NOTCH AT PHASE 1 STEP 1 CONSTRUCTION JOINT AND REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT STREET INTERSECTIONS AND DRIVEWAYS WITH ROADWAY CONSTRUCTION. CONSTRUCT STREET INTERSECTIONS IDENTICAL TO ROADWAY SECTION EXCEPT FOR DACY LANE. DACY LANE WILL BE CONSTRUCTED WITH FULL DEPTH HMA IN HALF WIDTHS. SEE MISCELLANEOUS DETAILS PLAN SHEET FOR ADDITIONAL INFORMATION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO ALL STREETS AND DRIVEWAYS AT ALL TIMES. FINAL HMA SURFACE FOR HILLSIDE TERRACE & STREET INTERSECTIONS TO BE CONSTRUCTED IN LATER PHASE.
   DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMAC GRADE TO EXISTING GRADE USING HMAC OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 STEP 2, PROCEED TO PHASE 1 STEP 3 CONSTRUCTION.

PHASE 1 - STEP 3 CONSTRUCTION - STA 32+30 TO STA 40+50:

1. AFTER COMPLETION OF PHASE 1 STEP 2, REMOVE & MOVE LPCB AND TRAFFIC CONTROL DEVICES FROM PHASE 1 STEP 2 TRAFFIC LANES. REMOVE WORK ZONE PAVEMENT MARKINGS FROM STA 32+00 TO 43+30 AND CONSTRUCT NEW WORK ZONE PAVEMENT MARKING FOR PHASE 1 STEP 3.

2. REMOVE TEMPORARY PAVEMENT FROM STA 32+30 TO 39+50. TEMPORARY PAVEMENT FROM STA 39+50 TO 43+30 TO REMAIN IN PLACE AND BE UTILIZED FOR PHASE 2 STEP 1. REMOVE TEMPORARY 2' OF CULVERT 02 AND COMPLETE HEADWALL & RIPRAP (LEFT SIDE). CONSTRUCT PROPOSED CURB & GUTTER, REMAINING STORM SEWER INLET AND EMBANKMENT BEHIND CURB FROM STA 32+00 TO 40+50. AFTER COMPLETION OF PHASE 1 STEP 3, CONSTRUCT WORK ZONE PAVEMENT MARKINGS NONREMOVABLE TO FINAL LANE CONFIGURATION FROM IH 35 FRONTAGE ROAD TO STA 32+00 AND PHASE 2 STEP 1 LANE CONFIGURATION FROM STA 32+00 TO SHELLSTONE TRAIL AND OPEN TO TRAFFIC.

   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMAC GRADE TO EXISTING GRADE USING HMAC OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

3. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 1 STEP 3, REMOVE EXISTING CURB & GUTTER FROM STA 44+00 TO 52+60 (LT SIDE). REMOVE EXISTING CULVERT & CONSTRUCT PROPOSED CULVERT 03 (STA 44+72) IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC. CULVERT 03 WINGWALLS WILL BE COMPLETED IN PHASE 2 STEPS 1 & 2.
   CONSTRUCT TEMPORARY PAVEMENT IN ACCORDANCE WITH ITEM 508 FOR PHASE 2 STEP 1 WESTBOUND TRAFFIC LANE FROM STA 43+30 TO STA 52+60. THE REMOVAL OF EXISTING CURB & GUTTER AND CONSTRUCTION OF TEMPORARY PAVEMENT TO BE DONE USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ALL LANES TO BE OPEN AT THE END OF THE WORK DAY. PROCEED TO PHASE 2 STEP 1 CONSTRUCTION.

PHASE 2 - STEP 1 CONSTRUCTION - STA 39+50 TO STA 52+00:

1. SET-UP DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM SHELLSTONE TRAIL TO OLD GOFORTH ROAD. THEN SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG RIGHT SIDE OF PHASE 2 STEP 1 FOR WESTBOUND TRAFFIC ONLY.

2. COMPLETE CONSTRUCTION OF RIGHT SIDE OF CULVERT 03 WITH WINGWALL & RIPRAP. CONSTRUCT STORM SEWER TRUNKLINE, INLETS AND LATERALS. LATERALS TO BE CONSTRUCTED, CAPPED & COMPLETED IN PHASE 2 STEP 2.

3. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT)IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAYS IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONSTRUCT TORI DRIVE FULL DEPTH HMA IN HALF WIDTHS. SEE MISCELLANEOUS DETAILS PLAN SHEET FOR ADDITIONAL INFORMATION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AND TORI DRIVE AT ALL TIMES. FINAL HMA SURFACE FOR HILLSIDE TERRACE & TORI DRIVE TO BE CONSTRUCTED IN LATER PHASE.
   DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

4. CONSTRUCT TEMPORARY PAVEMENT IN ACCORDANCE WITH ITEM 508 FROM STA 52+00 TO 53+75 FOR PHASE 2 STEP 2 TRAFFIC LANES.
   AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMAC GRADE TO EXISTING GRADE USING HMAC OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

5. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 2 STEP 1, CONSTRUCT WORK ZONE PAVEMENT MARKINGS NONREMOVABLE FROM STA 32+00 TO SHELLSTONE TRAIL TO FINAL LANE CONFIGURATION AND FROM SHELLSTONE TRAIL TO STA 53+50 FOR PHASE 2 STEP 2 TRAFFIC LANES AND REMOVE DETOUR FOR EASTBOUND TRAFFIC. THEN PROCEED TO PHASE 2 STEP 2 CONSTRUCTION.

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

DESIGNED BY:		SHEET 1 OF 3
DRAWN BY:		24
CHECKED BY:		
APPROVED BY:		

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PHASE 2 - STEP 2 CONSTRUCTION - STA 39+50 TO STA 52+00:

1. SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG LEFT SIDE OF PHASE 2 STEP 2 TRAFFIC LANES.

2. COMPLETE CULVERT 03 CONSTRUCTION WITH WINGWALL & RIPRAP (LEFT SIDE). COMPLETE STORM SEWER INLETS AND LATERALS. COMPLETE LATERALS FROM PHASE 2 STEP 1 CONSTRUCTION. ALL INLETS TO BE OPENED FOR DRAINAGE AFTER COMPLETION OF STORM SEWER SYSTEM.

3. NOTCH AT PHASE 2 STEP 1 CONSTRUCTION JOINT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT OLD GOFORTH ROAD INTERSECTION IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO OLD GO FORTH ROAD AT ALL TIMES. FINAL HMA SURFACE FOR HILLSIDE TERRACE TO BE CONSTRUCTED IN LATER PHASE.
DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

4. REMOVE EXISTING CURB & GUTTER AND CONSTRUCT TEMPORARY PAVEMENT IN ACCORDANCE WITH ITEM 508 FROM STA 52+00 TO 59+00 FOR PHASE 3 STEP 1 WESTBOUND ONLY TRAFFIC LANE.
AT CONSTRUCTION BREAKS, INSTALL A TRANSITION FROM PROP HMAC GRADE TO EXISTING GRADE USING HMAC OR AS DIRECTED BY THE CONSTRUCTION OBSERVER FOR APPROXIMATELY 50 LF. THE TRANSITION WILL NOT BE PAID FOR DIRECTLY BUT CONSIDERED SUBSIDIARY TO VARIOUS BID ITEMS.

5. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 2 STEP 2.
THEN PROCEED TO PHASE 2 STEP 3.

PHASE 2 - STEP 3 CONSTRUCTION - STA 39+50 TO STA 52+00:

1. AFTER COMPLETION OF PHASE 2 STEP 2, REMOVE PHASE 2 STEP 2 WORK ZONE PAVEMENT MARKINGS. THEN CONSTRUCT WORK ZONE PAVEMENT MARKINGS NONREMOVABLE TO FINAL LANE CONFIGURATION FROM SHELLSTONE TRAIL TO OLD GOFORTH ROAD. SET-UP DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM OLD GOFORTH ROAD TO GREEN MEADOWS LANE AND PLACE WORK ZONE PAVEMENT MARKINGS FOR PHASE 3 STEP 1 WESTBOUND TRAFFIC ONLY FROM STA 52+00 TO 72+00.
AFTER COMPLETION OF WORK ZONE PAVEMENT MARKINGS, OPEN TO TRAFFIC AND PROCEED TO PHASE 3 STEP 1 CONSTRUCTION.

PHASE 3 - STEP 1 CONSTRUCTION - STA 52+00 TO STA 62+00:

1. SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG RIGHT SIDE OF PHASE 3 STEP 1 WESTBOUND ONLY TRAFFIC LANE.

2. CONSTRUCT RIGHT SIDE OF CULVERT 04. MAKE TEMPORARY CONNECTION TO EXISTING CULVERT TO MAINTAIN DRAINAGE. ALL WORK FOR TEMPORARY CONNECTION IS SUBSIDIARY TO CULVERT ITEMS. CONSTRUCT STORM SEWER TRUNKLINE, INLETS AND LATERALS.
LATERALS TO BE CONSTRUCTED, CAPPED & COMPLETED IN PHASE 3 STEP 2.

3. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT)IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAYS IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AT ALL TIMES. FINAL HMA SURFACE FOR HILLSIDE TERRACE TO BE CONSTRUCTED IN LATER PHASE.
DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

4. REMOVE EXISTING CURB & GUTTER FROM STA 61+00 TO 62+00 (RT SIDE). CONSTRUCT TEMPORARY PAVEMENT IN ACCORDANCE WITH ITEM 508 FOR PHASE 3 STEP 2 WESTBOUND TRAFFIC LANE.

5. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 3 STEP 1, CONSTRUCT WORK ZONE PAVEMENT MARKINGS FROM STA 52+00 TO 64+00 FOR PHASE 3 STEP 2 WESTBOUND ONLY TRAFFIC LANE. EXISTING WORK ZONE PAVEMENT MARKINGS FROM STA 64+00 TO 71+00 TO REMAIN FOR PHASE 3 STEP 2. DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC TO REMAIN IN PLACE UNTIL THE COMPLETION OF PHASE 3 STEP 2. PROCEED TO PHASE 3 STEP 2 CONSTRUCTION.

PHASE 3 - STEP 2 CONSTRUCTION - STA 52+00 TO STA 61+00:

1. SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG LEFT SIDE OF PHASE 3 STEP 1 WESTBOUND ONLY TRAFFIC LANE.

2. COMPLETE CULVERT 04 CONSTRUCTION, STORM SEWER INLETS AND LATERALS. COMPLETE LATERALS FROM PHASE 3 STEP 1 CONSTRUCTION. ALL INLETS TO BE OPENED FOR DRAINAGE AFTER COMPLETION OF STORM SEWER SYSTEM.

3. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAYS IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONSTRUCT GREEN MEADOWS LANE FULL DEPTH HMA IN HALF WIDTHS. SEE MISCELLANEOUS DETAILS PLAN SHEET FOR ADDITIONAL INFORMATION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AND GREEN MEADOWS LANE AT ALL TIMES.
FINAL HMA SURFACE FOR HILLSIDE TERRACE & GREEN MEADOWS LANE TO BE CONSTRUCTED IN LATER PHASE.
DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.

4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 3 STEP 2.
PROCEED TO PHASE 3 STEP 3 CONSTRUCTION.

PHASE 3 - STEP 3 CONSTRUCTION - STA 52+00 TO STA 64+00:

1. AFTER COMPLETION OF PHASE 3 STEP 2, REMOVE PHASE 3 STEP 2 WORK ZONE PAVEMENT MARKINGS. THEN CONSTRUCT WORK ZONE PAVEMENT MARKINGS NONREMOVABLE TO FINAL LANE CONFIGURATION FROM OLD GOFORTH ROAD TO STA 54+50. CONSTRUCT WORK ZONE PAVEMENT MARKINGS FOR TWO LANES (ONE EASTBOUND LANE & ONE WESTBOUND LANE) FROM STA 54+50 TO 64+00 FOR PHASE 4 STEP 1.
WORK ZONE PAVEMENT MARKINGS FROM STA 64+00 TO 71+00 TO REMAIN FROM PHASE 3 STEP 1.
EXISTING PAVEMENT MARKINGS FROM STA 71+00 TO 106+93 TO REMAIN FOR PHASE 4 STEP 1.
ALSO REMOVE DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC. AFTER COMPLETION OF WORK ZONE PAVEMENT MARKINGS AND REMOVAL OF DETOUR, OPEN TO TRAFFIC AND PROCEED TO PHASE 4 STEP 1 CONSTRUCTION.

PHASE 4 - STEP 1 CONSTRUCTION - STA 62+00 TO STA 106+93:

1. CONTRACTOR MAY COMBINE PHASE 4 AND PHASE 5 CONSTRUCTION WITH APPROVAL FROM THE ENGINEER AND/OR CONSTRUCTION OBSERVER. SET-UP GOFORTH DETOUR, IF PHASE 5 CONSTRUCTION IS ALLOWED.

2. TRAFFIC TO REMAIN ON EXISTING HILLSIDE TERRACE LANES FOR PHASE 4 STEP 1 CONSTRUCTION FROM STA 62+00 TO 106+93.

3. CONSTRUCT RIGHT SIDE OF CULVERT 05. MAKE TEMPORARY CONNECTIONS TO EXISTING CULVERT TO MAINTAIN DRAINAGE. EXISTING MBGF AT CULVERT 5 TO REMAIN IN PLACE UNTIL COMPLETION OF STEP 1.
ALL WORK FOR TEMPORARY CONNECTION IS SUBSIDIARY TO CULVERT ITEMS.
REMOVE EXISTING CULVERT 07 & CONSTRUCT COMPLETE LENGTH OF PROPOSED CULVERT 07. TEMPORARILY CONSTRUCT LEFT SIDE OF THE CULVERT 16' LONGER TO BE OUTSIDE EXISTING ROADWAY. REMOVE THE 16' & COMPLETE END TREATMENT IN PHASE 4 STEP 2. CONSTRUCT CULVERT 07 IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC.
CONSTRUCT STORM SEWER TRUNKLINES, INLETS AND LATERALS. LATERALS TO BE CONSTRUCTED, CAPPED AND COMPLETED IN PHASE 4 STEP 2.
FOR STORM SEWER SYSTEM I, CONSTRUCT INLETS & LATERALS. BLOCK THE INLETS AND CAP LATERALS. LEAVE TEMPORARY OPENINGS IN CURB TO ALLOW FOR DRAINAGE UNTIL COMPLETION OF SYSTEM I IN PHASE 4 STEP 2.

4. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAYS IN HALF WIDTHS WITH ROADWAY CONSTRUCTION.
CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AT ALL TIMES.
FINAL HMA SURFACE FOR HILLSIDE TERRACE TO BE CONSTRUCTED AT THE END OF PHASE 4.

5. CONSTRUCT WORK ZONE PAVEMENT MARKINGS FROM STA 54+50 TO 106+93 FOR PHASE 4 STEP 2 CONSTRUCTION.

6. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 4 STEP 1, THEN PROCEED TO PHASE 4 STEP 2 CONSTRUCTION.

PHASE 4 - STEP 2 CONSTRUCTION - STA 61+00 TO STA 106+93:

1. SET-UP TRAFFIC CONTROL DEVICES AND LOW PROFILE CONCRETE BARRIER ALONG LEFT SIDE OF PHASE 4 STEP 2 TRAFFIC LANES FROM STA 60+00 TO 64+00.

2. REMOVE EXISTING CULVERT & COMPLETE CULVERT 05 CONSTRUCTION. REMOVE TEMPORARY 16' OF CULVERT 07 AND COMPLETE END TREATMENT (LEFT SIDE). COMPLETE STORM SEWER INLETS AND LATERALS. COMPLETE LATERALS FROM PHASE 4 STEP 1 CONSTRUCTION. ALL INLETS TO BE OPENED FOR DRAINAGE AFTER COMPLETION OF STORM SEWER SYSTEM.

3. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT REMAINDER OF PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT GREEN MEADOWS LANE AND DRIVEWAYS IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AND GREEN MEADOWS LANE AT ALL TIMES.

4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 4 STEP 2, CONSTRUCT WORK ZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH FINAL LANE CONFIGURATION FROM STA 54+50 TO 106+93. THEN PROCEED TO PHASE 4 STEP 3 CONSTRUCTION.

PHASE 4 - STEP 3 CONSTRUCTION - STA 12+82 TO STA 106+93:

1. CONSTRUCT FINAL 2" HMA SURFACE FROM OLD GOFORTH ROAD TO FM 2001, THEN CONSTRUCT FINAL SURFACE FROM IH 35 TO OLD GOFORTH ROAD. INSTALL WORK ZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH FINAL LANE CONFIGURATION BY THE END OF EACH DAY PRIOR TO OPENING TO TRAFFIC. THEN PLACE FINAL PAVEMENT MARKINGS ON HILLSIDE TERRACE FROM STA 12+82 TO 106+93. ALL WORK TO BE DONE USING STANDARDS TCP (2-2)-18 & TCP (2-4)-18 FOR DAILY LANE CLOSURES. AFTER COMPLETION OPEN ALL LANES TO TRAFFIC.

2. SET-UP DETOUR FOR OLD GOFORTH ROAD NORTHBOUND TRAFFIC FROM HILLSIDE TERRACE TO GREEN MEADOWS LANE AND PLACE WORK ZONE PAVEMENT MARKINGS FOR PHASE 5 STEP 1 SOUTHBOUND TRAFFIC ONLY FROM STA 0+36 TO 16+65.
THEN PROCEED TO PHASE 5 STEP 1 CONSTRUCTION.

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
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TBPE Registration No. F-1046

HILLSIDE TERRACE

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

DESIGNED BY:		SHEET 2 OF 3
DRAWN BY:		25
CHECKED BY:		
APPROVED BY:		

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PHASE 5 - STEP 1 (OLD GOFORTH ROAD) CONSTRUCTION STA 0+36 TO STA 16+65:

1. CONTRACTOR MAY COMBINE PHASE 4 AND PHASE 5 CONSTRUCTION WITH APPROVAL FROM THE ENGINEER AND/OR CONSTRUCTION OBSERVER. SET-UP GOFORTH DETOUR, IF PHASE 5 CONSTRUCTION IS ALLOWED.
2. SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG PHASE 5 STEP 1 SOUTHBOUND ONLY TRAFFIC LANE.
3. EXTEND LEFT SIDE OF CULVERT 9, CONSTRUCT HEADWALL AND RIPRAP. CONSTRUCT STORM SEWER TRUNKLINE, INLETS AND LATERALS. FOR STORM SEWER SYSTEMS K & L, CONSTRUCT INLETS & LATERALS. BLOCK THE INLETS AND CAP LATERALS. LEAVE TEMPORARY OPENINGS IN CURB TO ALLOW FOR DRAINAGE UNTIL COMPLETION OF SYSTEMS K & L IN PHASE 5 STEP 2.
4. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAY IN HALF WIDTHS WITH ROADWAY CONSTRUCTION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAY AT ALL TIMES. FINAL HMA SURFACE FOR OLD GOFORTH ROAD TO BE CONSTRUCTED AT THE END OF PHASE 5. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.
5. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 5 STEP 1, CONSTRUCT WORK ZONE PAVEMENT MARKINGS FOR PHASE 5 STEP 2 SOUTHBOUND ONLY TRAFFIC LANE. THEN PROCEED TO PHASE 5 STEP 2 CONSTRUCTION.

PHASE 5 - STEP 2 (OLD GOFORTH ROAD) CONSTRUCTION STA 0+36 TO STA 16+65:

1. SET-UP TRAFFIC CONTROL DEVICES AND MOVE LOW PROFILE CONCRETE BARRIER ALONG PHASE 5 STEP 1 SOUTHBOUND ONLY TRAFFIC LANE.
2. EXTEND RIGHT SIDE OF CULVERT 9, CONSTRUCT HEADWALL AND RIPRAP. CONSTRUCT STORM SEWER INLETS AND LATERALS. COMPLETE LATERALS FROM PHASE 5 STEP 1 CONSTRUCTION. ALL INLETS TO BE OPEN FOR DRAINAGE AFTER COMPLETION OF STORM SEWER SYSTEMS.
3. NOTCH EXISTING PAVEMENT & REMOVE EXISTING MATERIALS. REMOVAL OF EXISTING MATERIAL (INCLUDING PAVEMENT) IS INCLUDED IN THE EXCAVATION ITEM. CONSTRUCT PROPOSED PAVEMENT SECTION THROUGH CURB & GUTTER AND 4" HMA. CONSTRUCT DRIVEWAYS IN HALF WIDTHS WITH ROAD CONSTRUCTION. CONTRACTOR TO PROVIDE FOR SAFE AND CONVENIENT ACCESS TO DRIVEWAYS AT ALL TIMES. DURING NON WORKING HOURS ALL DROP-OFFS ARE TO BE BACKFILLED TO A 1:1 MAXIMUM SLOPE.
4. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 5 STEP 2, INSTALL WORK ZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH FINAL LANE CONFIGURATION AND REMOVE DETOUR FOR OLD GOFORTH ROAD. THEN PROCEED TO PHASE 5 STEP 3 CONSTRUCTION.

PHASE 5 - STEP 3 (OLD GOFORTH ROAD) CONSTRUCTION STA 0+36 TO STA 16+65:

1. AFTER COMPLETION OF ALL THE ABOVE TASKS FOR PHASE 5 STEP 2. CONSTRUCT FINAL 2" HMA SURFACE AND INSTALL WORK ZONE SHORT TERM PAVEMENT MARKINGS IN ACCORDANCE WITH FINAL LANE CONFIGURATION BY THE END OF EACH DAY PRIOR TO OPENING TO TRAFFIC. PLACE FINAL PAVEMENT MARKINGS ON OLD GOFORTH ROAD FROM STA 0+36 TO 16+65. ALL WORK TO BE DONE USING STANDARDS TCP (2-2)-18 FOR DAILY LANE CLOSURES. AFTER COMPLETION, OPEN ALL LANES TO TRAFFIC.

PRELIMINARY

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JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

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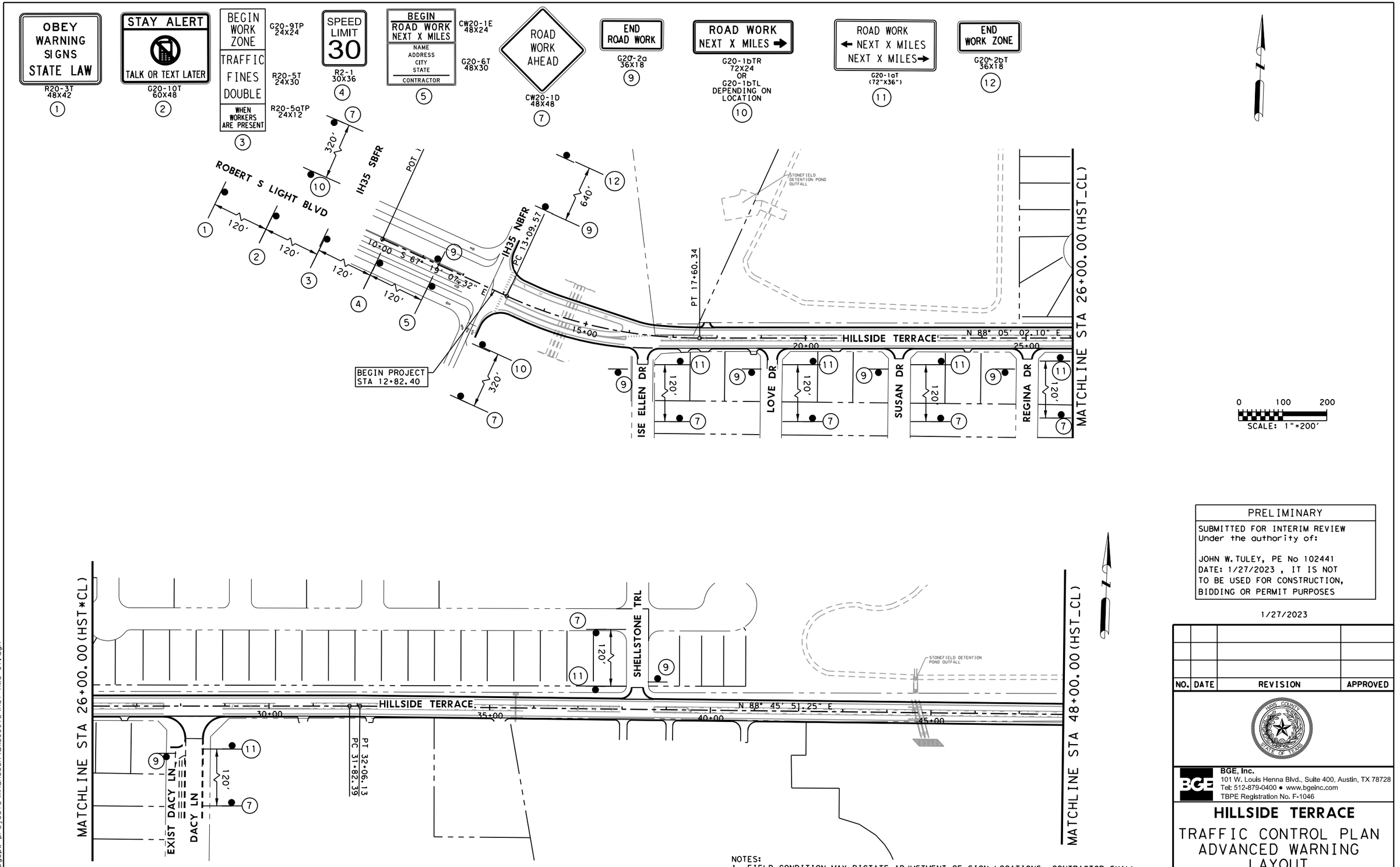
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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN SEQUENCE OF WORK

DESIGNED BY:		SHEET 3 OF 3
DRAWN BY:		26
CHECKED BY:		
APPROVED BY:		

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NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

PRELIMINARY

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1/27/2023

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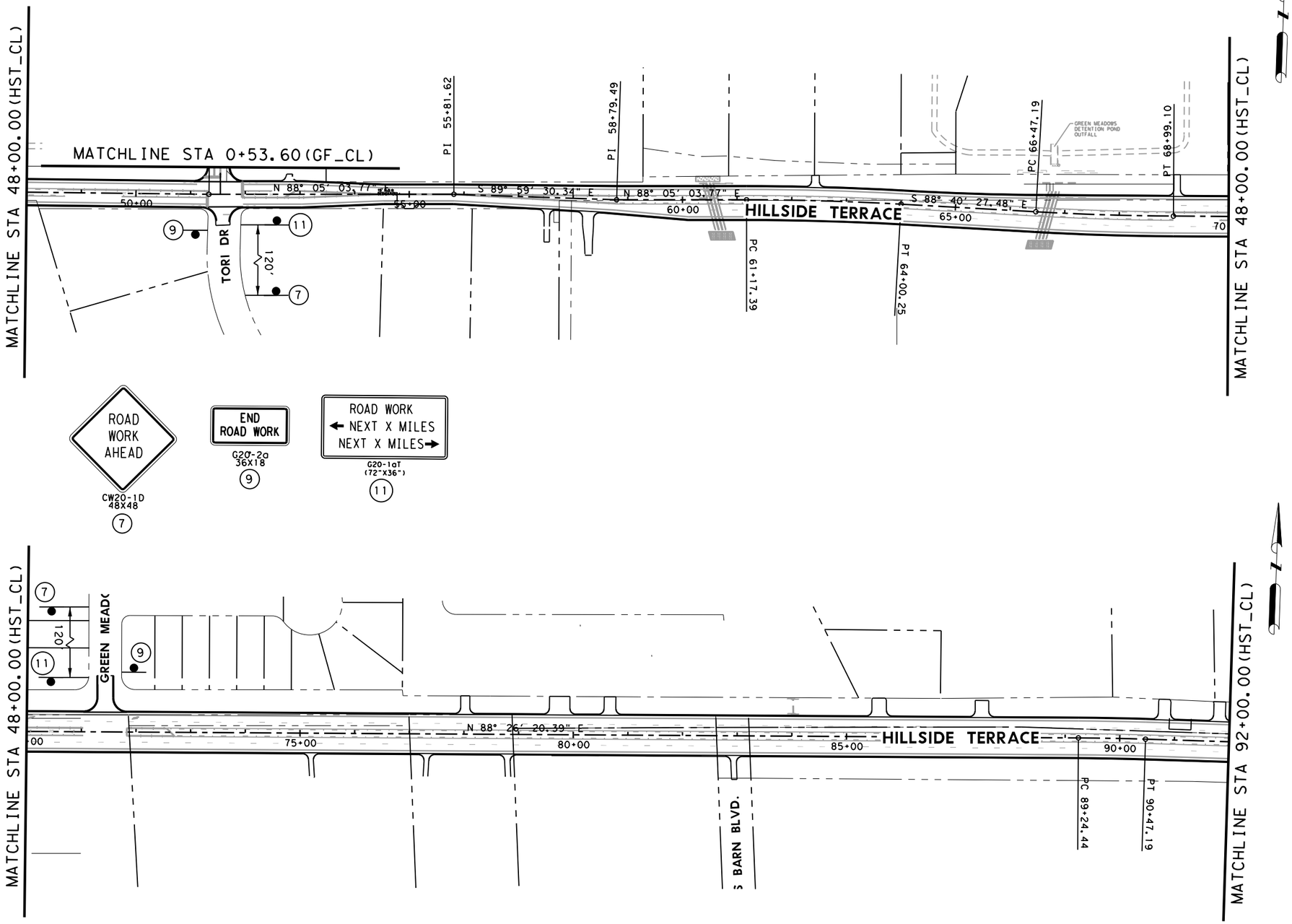
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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN ADVANCED WARNING LAYOUT

DESIGNED BY:		SHEET 1 OF 3
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NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

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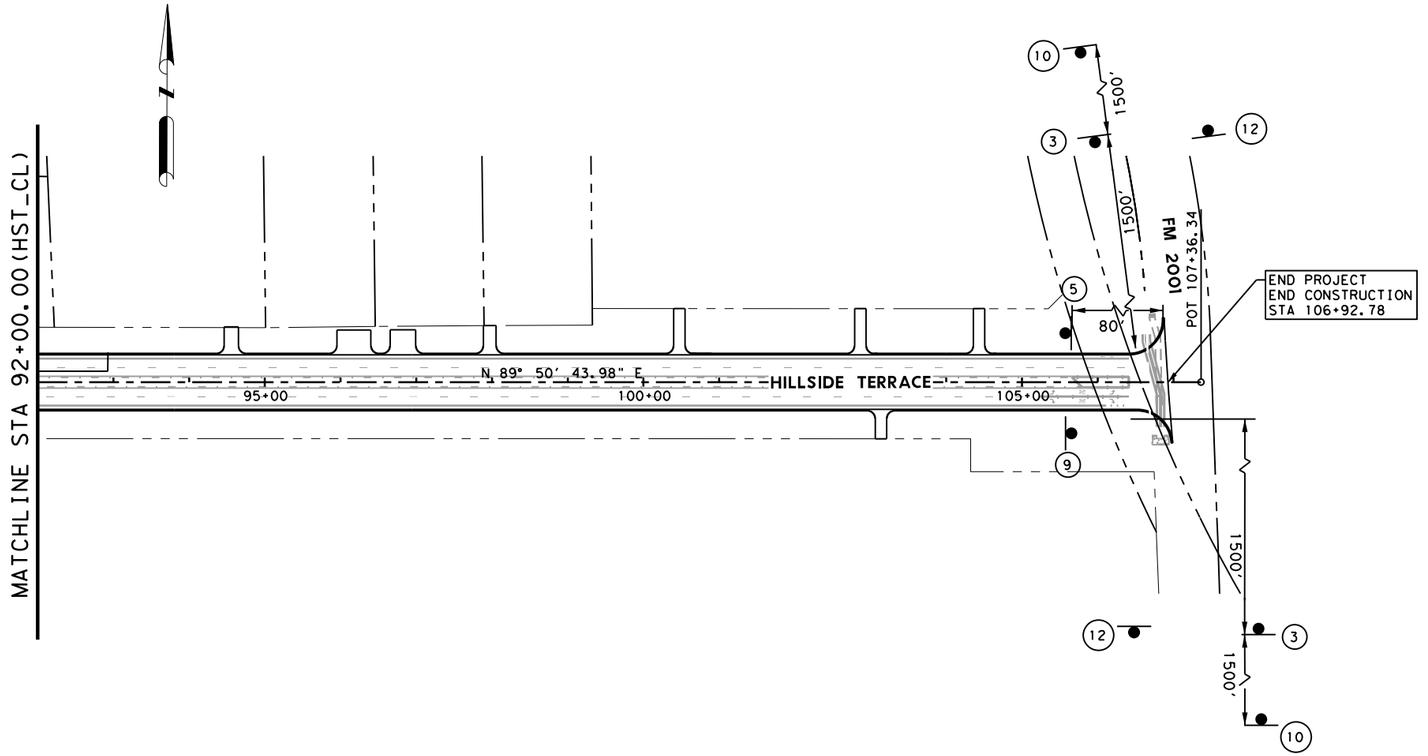
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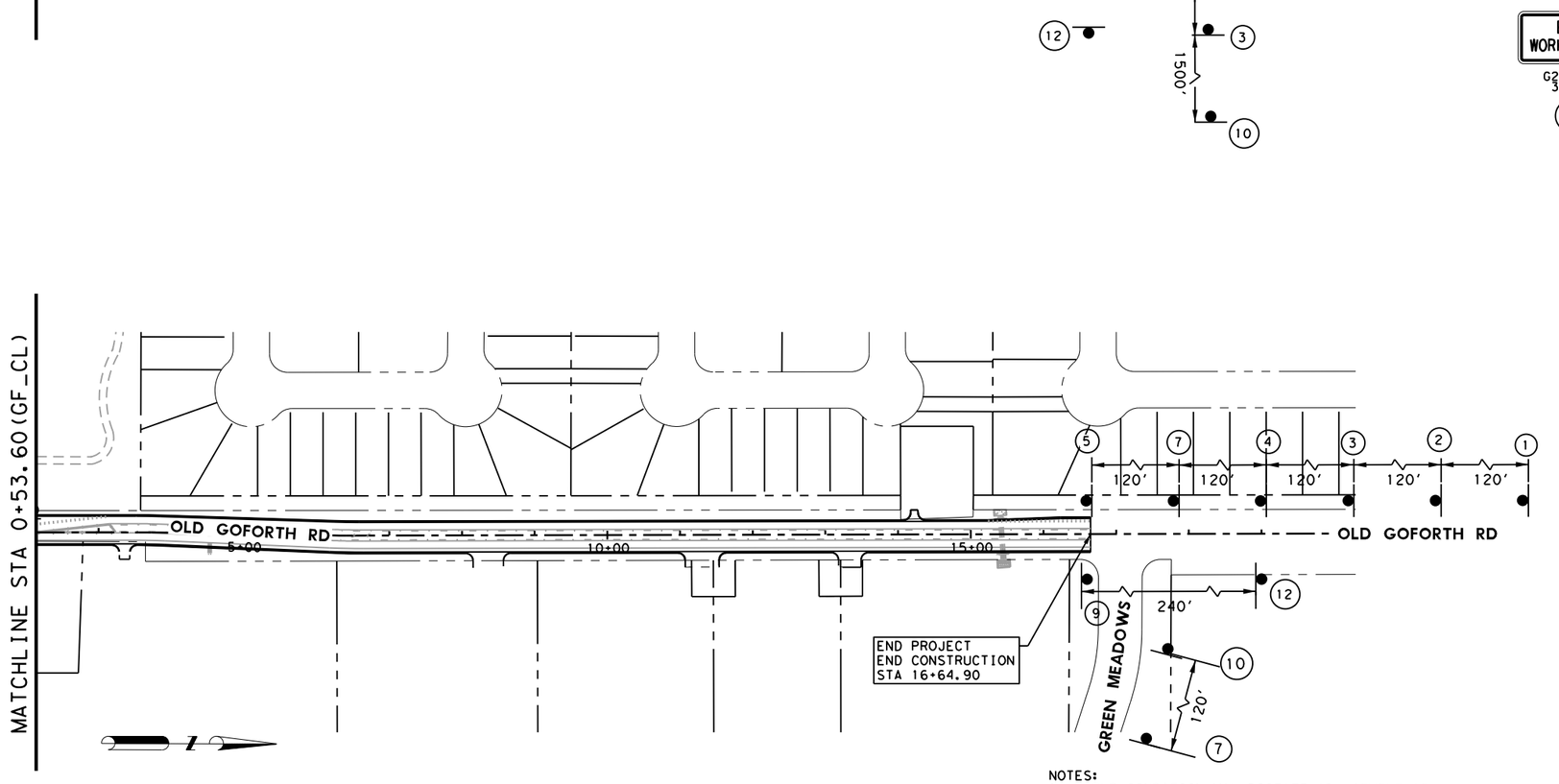
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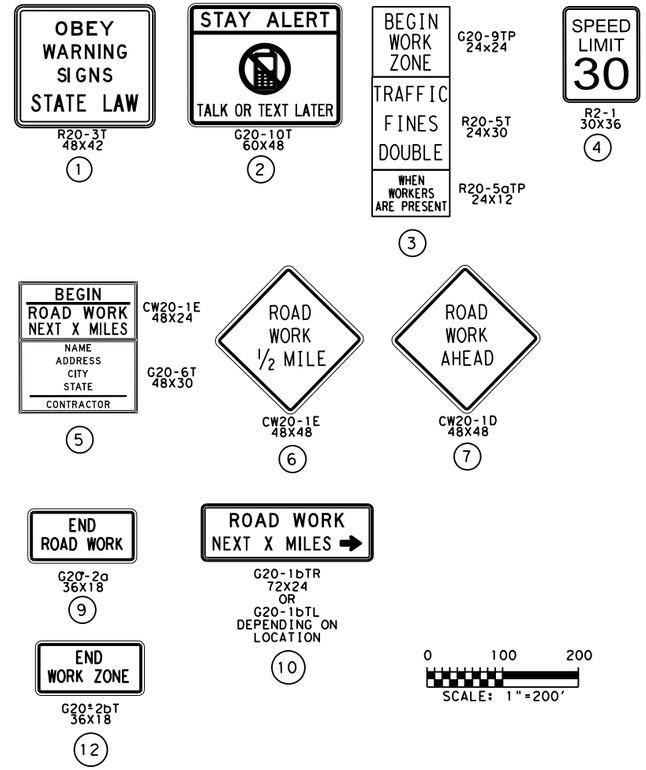
TRAFFIC CONTROL PLAN ADVANCED WARNING LAYOUT

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NOTES:
1. FIELD CONDITION MAY DICTATE ADJUSTMENT OF SIGN LOCATIONS. CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER PRIOR TO INSTALLATION OF ANY SIGNS.
2. REFER TO TRAFFIC CONTROL STANDARD SHEETS FOR OTHER REGULATORY AND WARNING SIGNS.
3. ADHERE AT ALL TIMES TO TxDOT STANDARDS BC(1)-21 THROUGH BC(12)-21, & TMUTCD FOR SIGN DETAILS, DIMENSIONS AND PLACEMENT.

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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN ADVANCED WARNING LAYOUT

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CITY OF BUDA

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-1R (21"X15")

GLENVIEW LN

FM 2001

IH-35 SBFR

IH-35 NBFR

OLD GOFORTH RD

OLD W TRL

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-3 (21"X15")

MARLSTONE TR

TANZANITE CIR

CALOMEL TR

TOM GREEN SCHOOL RD

TOM GREEN ELEMENTARY SCHOOL

HILLSIDE TERRACE
ROAD CLOSED
AT SHELLSTONE TRAIL
Portable Changeable Message Signs (PCMS)

ROBERT S LIGHT BLVD

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-1R (21"X15")

CW20-2D (36"X36") DETOUR AHEAD

CW20-2D (36"X36") DETOUR AHEAD

GREEN MEADOWS LN

JASPER TR

M4-8a (24"X18") END DETOUR

CW20-3B (36"X36") ROAD CLOSED 1000 FT

SANDSTONE TRAIL

SHELLSTONE TRAIL

TRAVERTINE TRAIL

WESTBOUND TRAFFIC ONLY (PHASE 2-STEP 1)

GREEN MEADOWS LANE

HILLSIDE TERRRACE

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-1L (21"X15")

ROAD CLOSED TO THRU TRAFFIC
R11-4 60" x 30"

ROAD CLOSED
R11-2 (48"X30") W/ TYPE 3 BARRICADE

DENISE ELLEN

LOVE DR

SUSAN DR

REGINA DR

DACY LN

TORI DR

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-1L (21"X15")
R3-2 (30"X30")

M4-8 (24"X12") DETOUR
M4-12T (VARX12") HILLSIDE TERRACE
M6-3 (21"X15")

IH-35 SBFR

IH-35 NBFR

McCORMICK MIDDLE SCHOOL

CW20-2D (36"X36") DETOUR AHEAD

HILLSIDE TERRACE
ROAD CLOSED
AT SHELLSTONE TRAIL
Portable Changeable Message Signs (PCMS)

DETOUR LAYOUT FOR HILLSIDE TERRACE EASTBOUND TRAFFIC. (WESTBOUND TRAFFIC ALLOWED THROUGH CONSTRUCTION ZONE.)

N

LEGEND:

- DIRECTION OF DETOUR TRAFFIC
- DIRECTION OF EXIST / LOCAL TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. REFER TO WORK ZONE ROAD CLOSURE DETAILS & BC STANDARDS FOR MINIMUM SIGN SPACING DISTANCE.

0 500 1000
HORIZONTAL SCALE: 1"=1000'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

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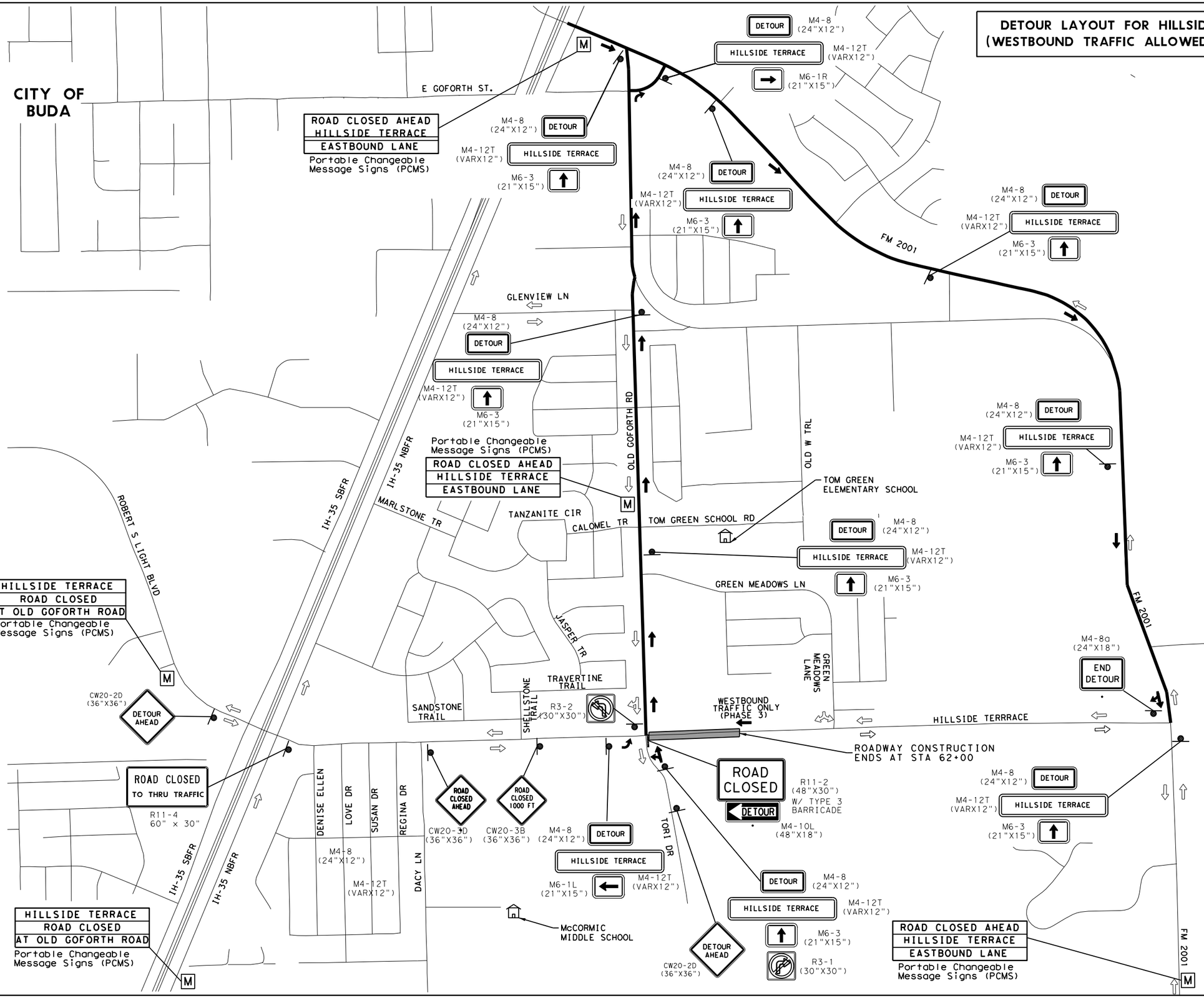
HILLSIDE TERRACE

DETOUR PLAN
PHASE 2 - STEP 1

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		30
CHECKED BY:		
APPROVED BY:		

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DETOUR LAYOUT FOR HILLSIDE TERRACE EASTBOUND TRAFFIC. (WESTBOUND TRAFFIC ALLOWED THROUGH CONSTRUCTION ZONE.)



LEGEND:

- DIRECTION OF DETOUR TRAFFIC
- DIRECTION OF EXIST / LOCAL TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. REFER TO WORK ZONE ROAD CLOSURE DETAILS & BC STANDARDS FOR MINIMUM SIGN SPACING DISTANCE.

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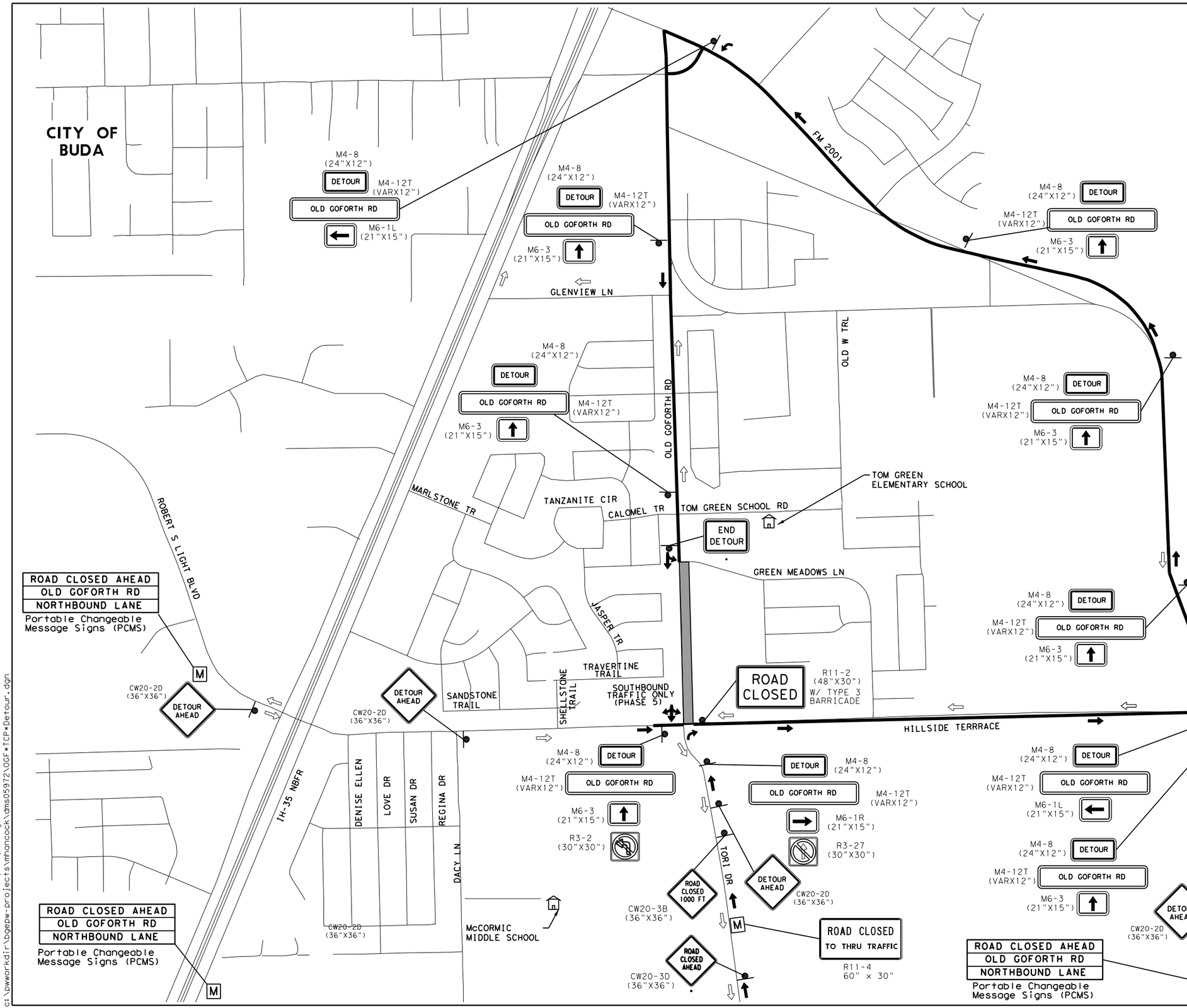
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HILLSIDE TERRACE

DETOUR PLAN
PHASE 3 - STEPS 1 & 2

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		31
CHECKED BY:		
APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\dms05972\HST*TCP*Phase3*Detour.dgn



LEGEND:

- DIRECTION OF DETOUR TRAFFIC
- DIRECTION OF EXIST / LOCAL TRAFFIC
- CONSTRUCTION THIS PHASE

NOTES:

1. DETOUR SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING PERMANENT SIGNS.
2. SIGNS AND BARRICADES SHOWN SHALL BE SUBSIDIARY TO ITEM 502.
3. COMPLETELY COVER SIGNS THAT CONFLICT WITH THE DETOUR. THESE SIGNS SHALL REMAIN COMPLETELY COVERED UNTIL THE SIGNS ARE APPLICABLE. THIS WORK WILL BE SUBSIDIARY TO ITEM 502.
4. REFER TO WORK ZONE ROAD CLOSURE DETAILS & BC STANDARDS FOR MINIMUM SIGN SPACING DISTANCE.

0 500 1000

HORIZONTAL SCALE: 1"=1000'

PRELIMINARY

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HAYS COUNTY — STATE OF TEXAS

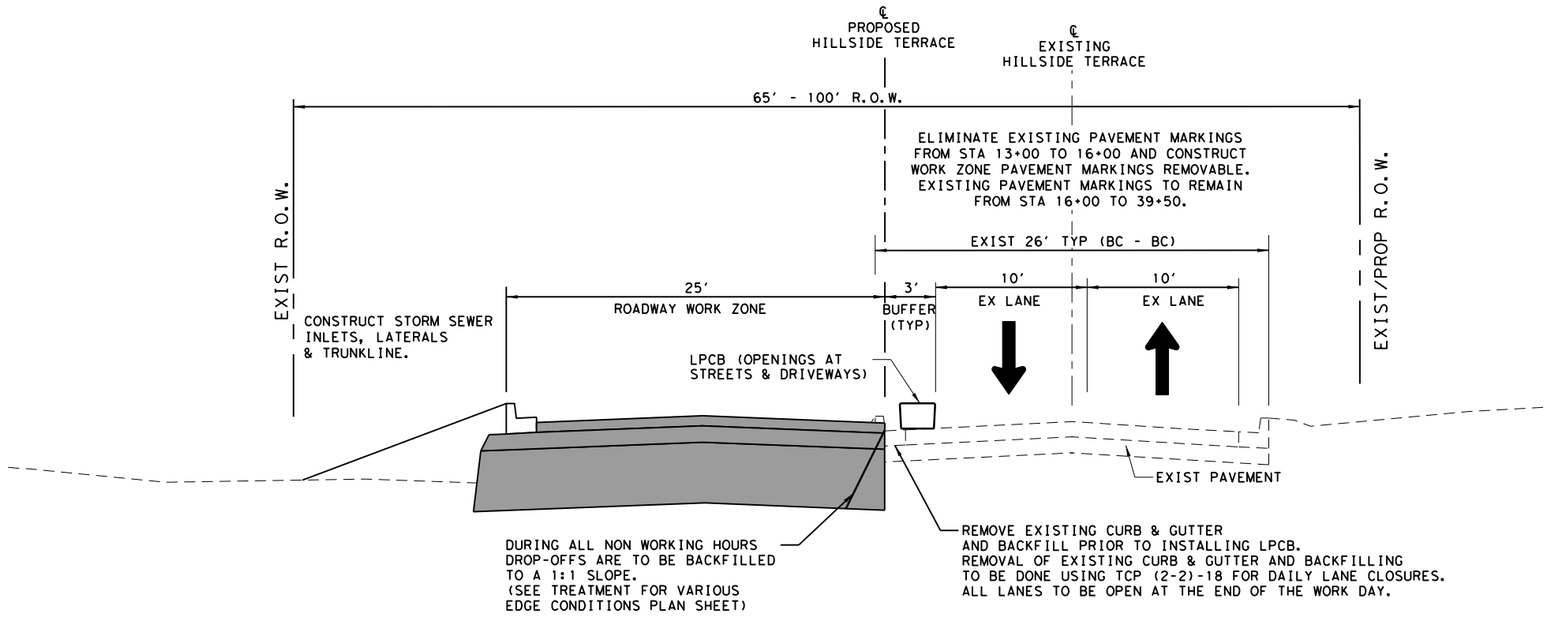
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HILLSIDE TERRACE

DETOUR PLAN
PHASE 5 - STEPS 1 & 2
OLD GOFORTH RD

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		32
CHECKED BY:		
APPROVED BY:		

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PHASE 1 - STEP 1

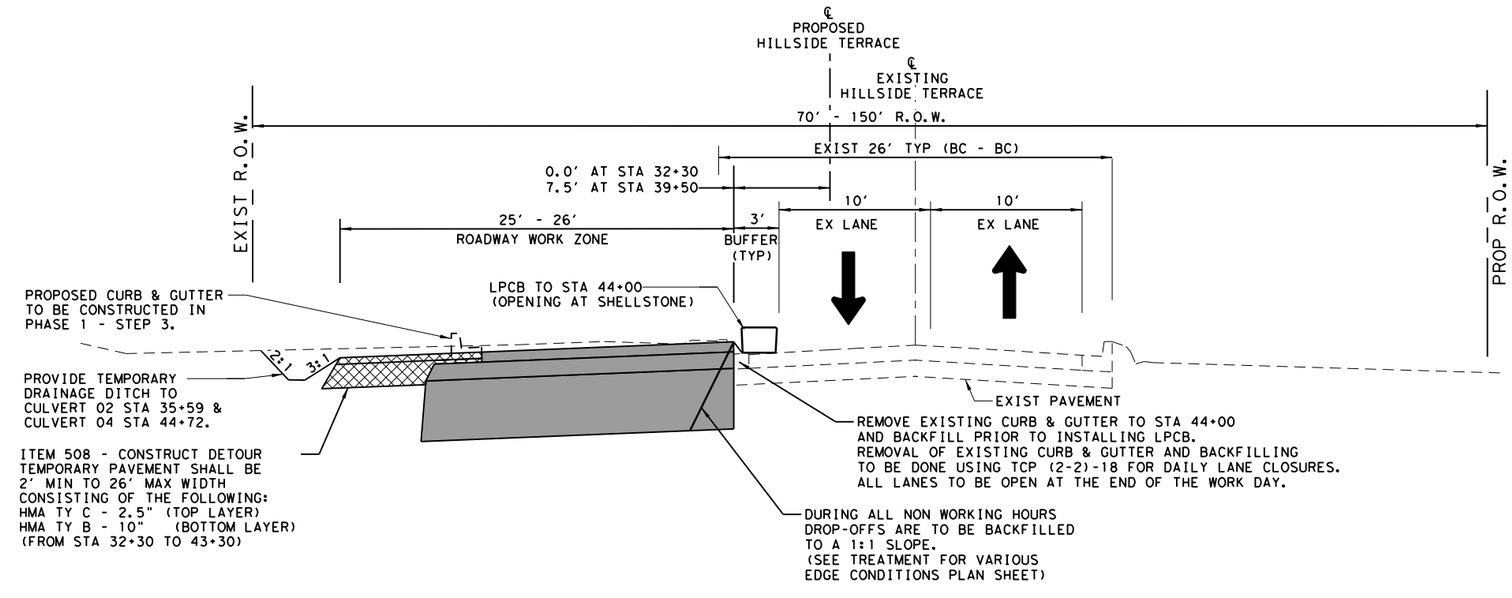
STA 12+82 TO 32+30

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 5 10
SCALE: 1"=10′



PHASE 1 - STEP 1

STA 32+30 TO 39+50
(IH 35 TO SHELLSTONE TRAIL)
(SHELLSTONE TRAIL - STA 38+34)

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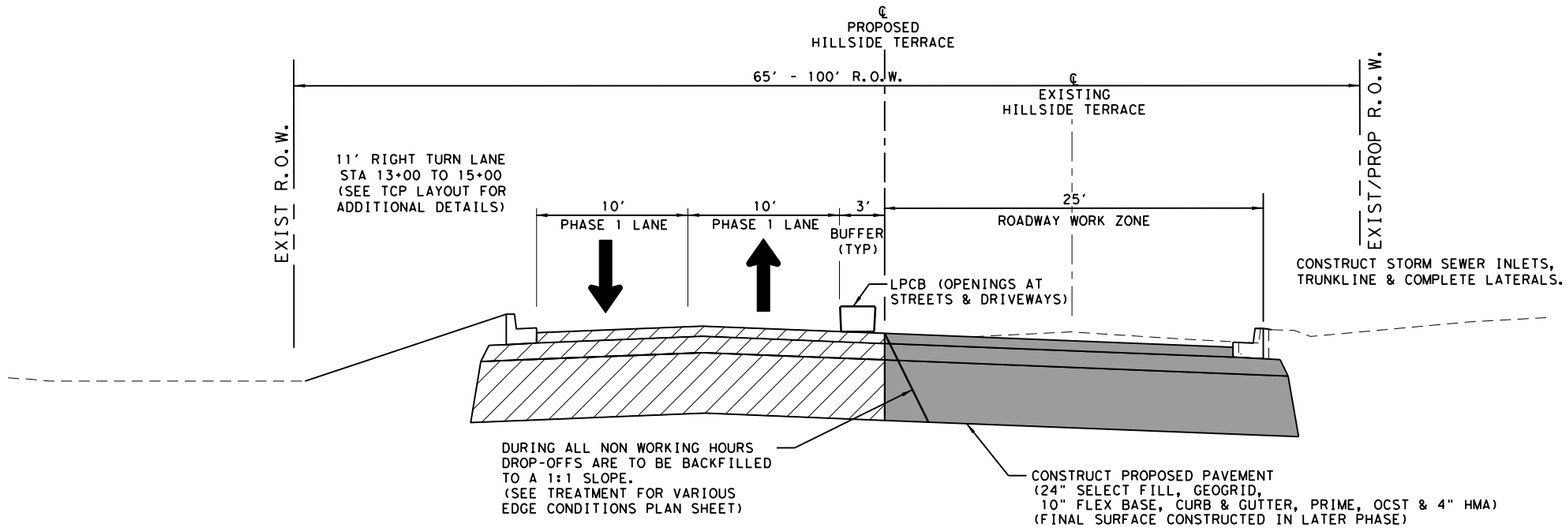
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 1 TYPICAL SECTIONS

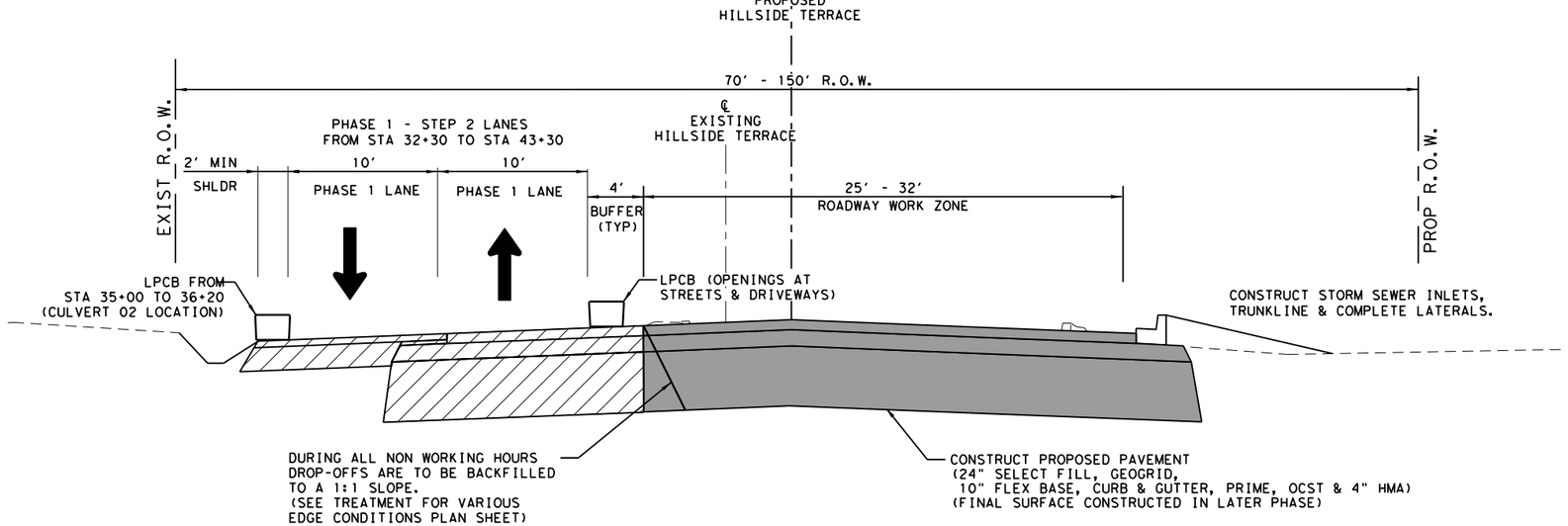
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DRAWN BY:		
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APPROVED BY:		

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PHASE 1 - STEP 2

STA 12+82 TO 32+30
(IH 35 TO SHELLSTONE TRAIL)



PHASE 1 - STEP 2

STA 32+30 TO 39+50
(IH 35 TO SHELLSTONE TRAIL)
(SHELLSTONE TRAIL - STA 38+34)

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

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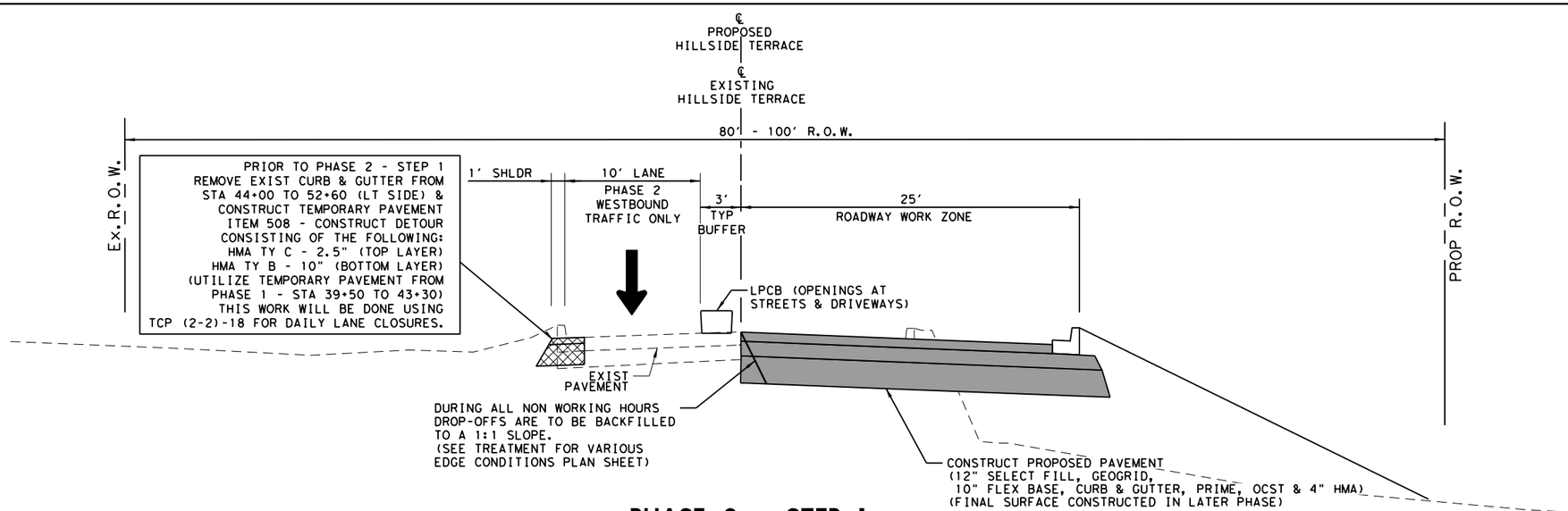
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 1 TYPICAL SECTIONS

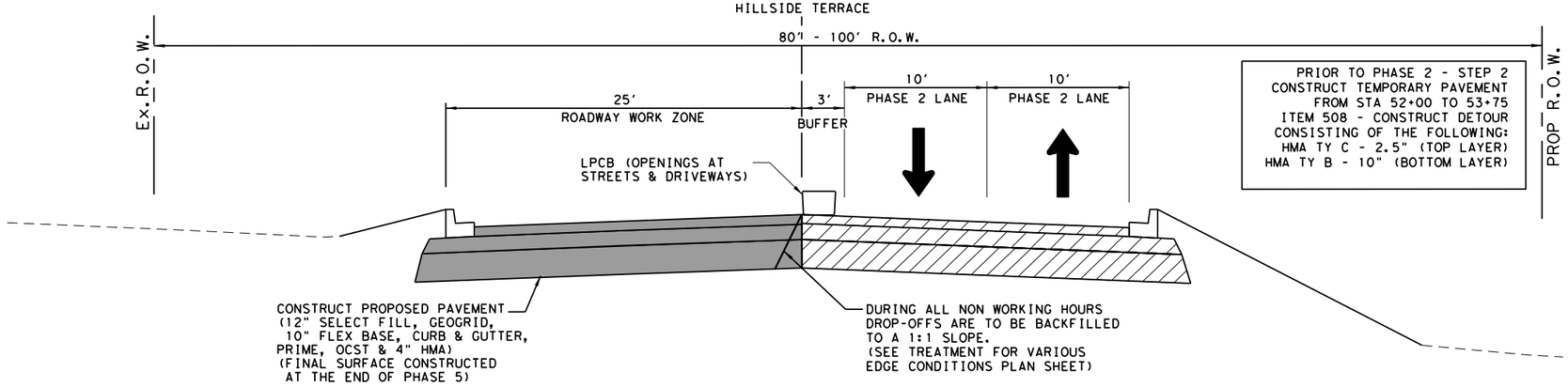
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PHASE 2 - STEP 1

STA 39+50 TO 52+00
(SHELLSTONE TRAIL TO OLD GOFORTH RD)



PHASE 2 - STEP 2

STA 39+50 TO 52+00
(SHELLSTONE TRAIL TO OLD GOFORTH RD)

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

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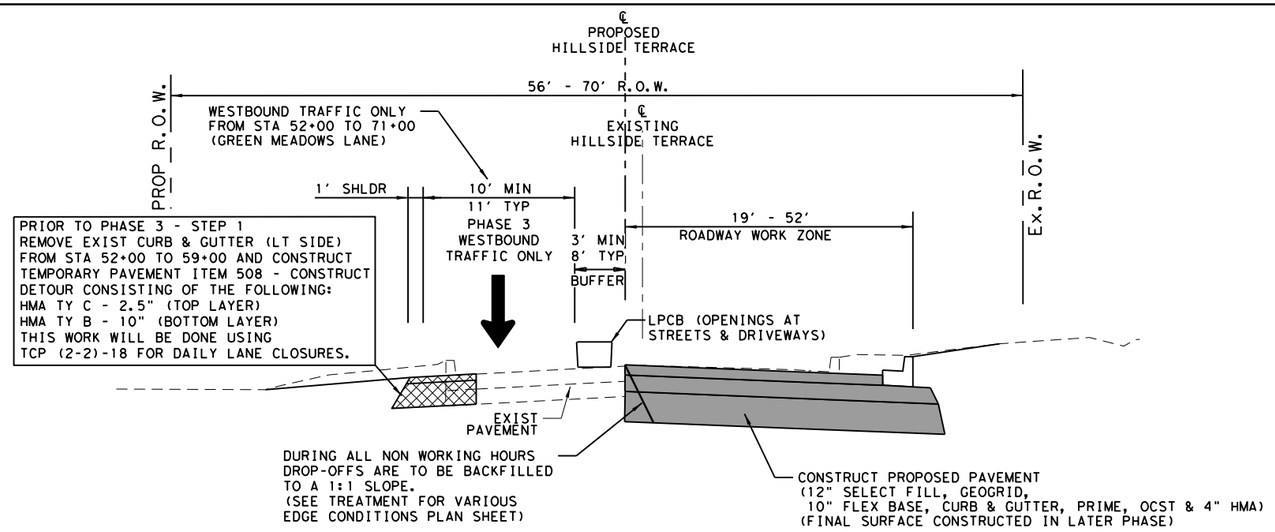
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 2 TYPICAL SECTIONS

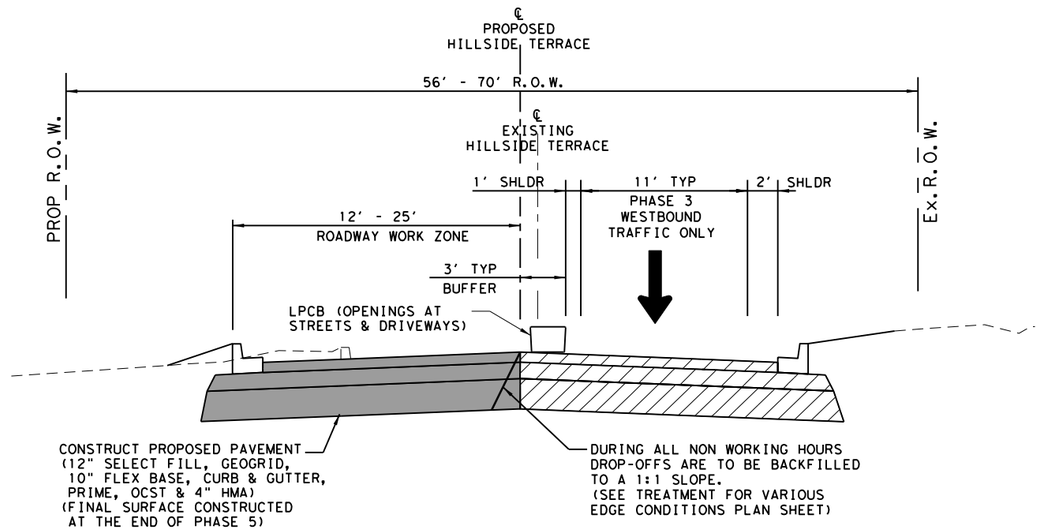
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DRAWN BY:		
CHECKED BY:		35
APPROVED BY:		

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PHASE 3 - STEP 1

STA 52+00 TO 62+00



PHASE 3 - STEP 2

STA 52+00 TO 61+00

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

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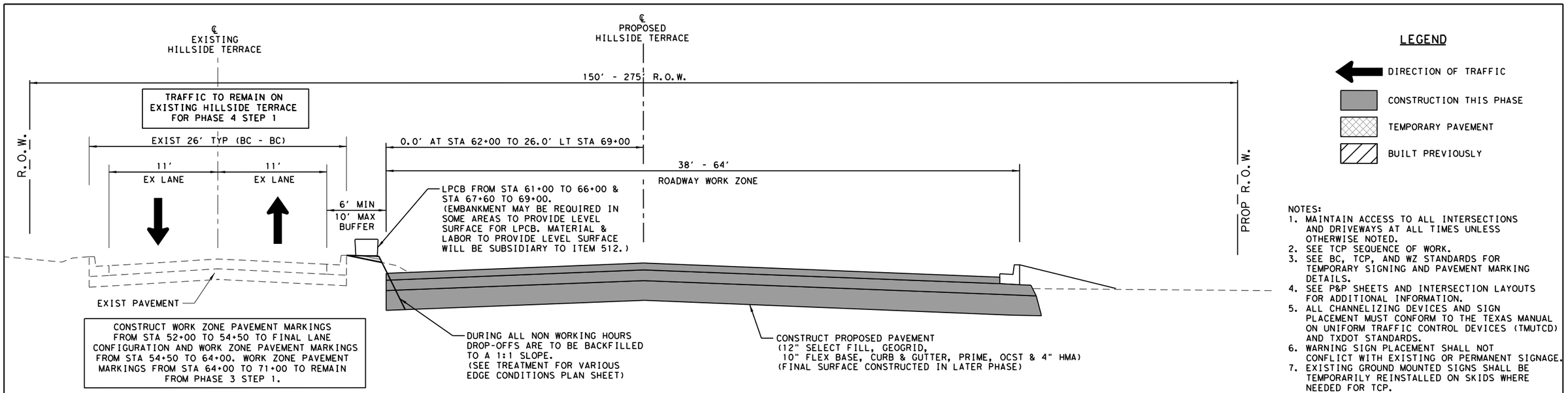
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 3 TYPICAL SECTIONS

DESIGNED BY:		SHEET 4 OF 6
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CHECKED BY:		36
APPROVED BY:		

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PHASE 4 - STEP 1

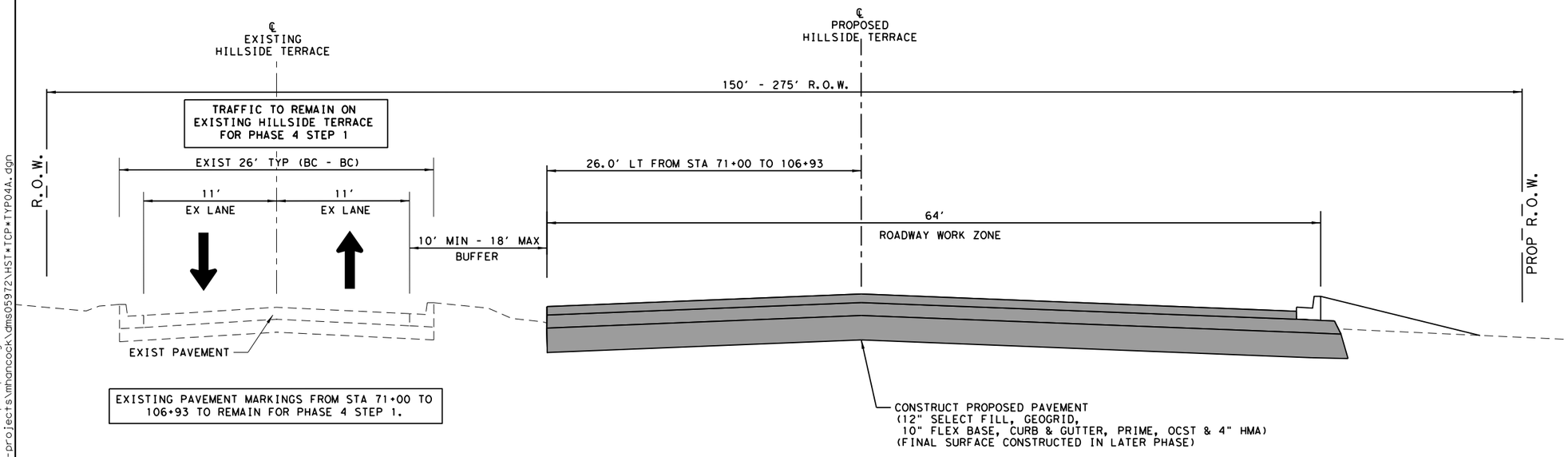
STA 62+00 TO 71+00

CONTRACTOR MAY COMBINE PHASE 4 AND PHASE 5 CONSTRUCTION WITH APPROVAL FROM THE ENGINEER AND/OR CONSTRUCTION OBSERVER. SET-UP GOFORTH DETOUR, IF PHASE 5 CONSTRUCTION IS ALLOWED.

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.



PHASE 4 - STEP 1

STA 71+00 TO 106+93

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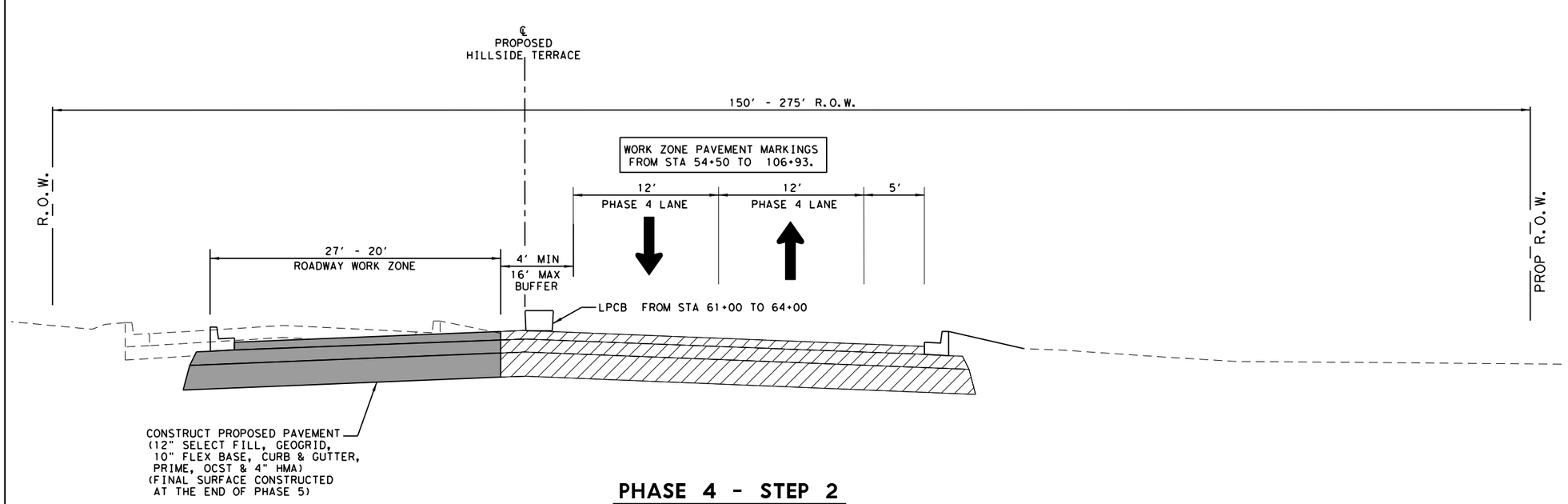
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 4 TYPICAL SECTIONS

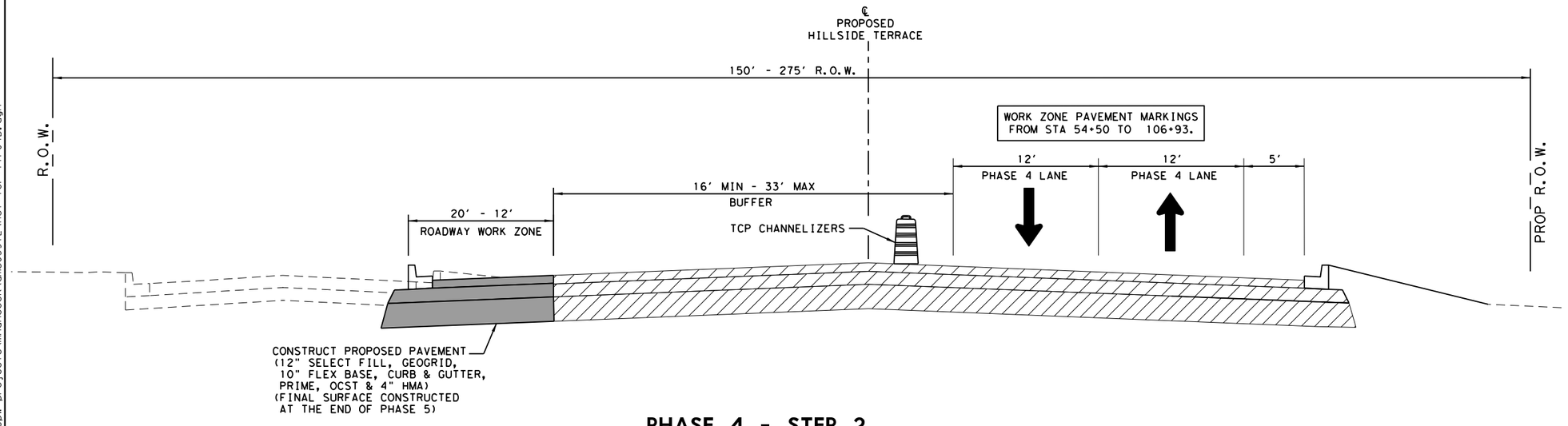
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CHECKED BY:		
APPROVED BY:		

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PHASE 4 - STEP 2

STA 61+00 TO 64+00



PHASE 4 - STEP 2

STA 64+00 TO 106+93

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

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1/27/2023

NO.	DATE	REVISION	APPROVED

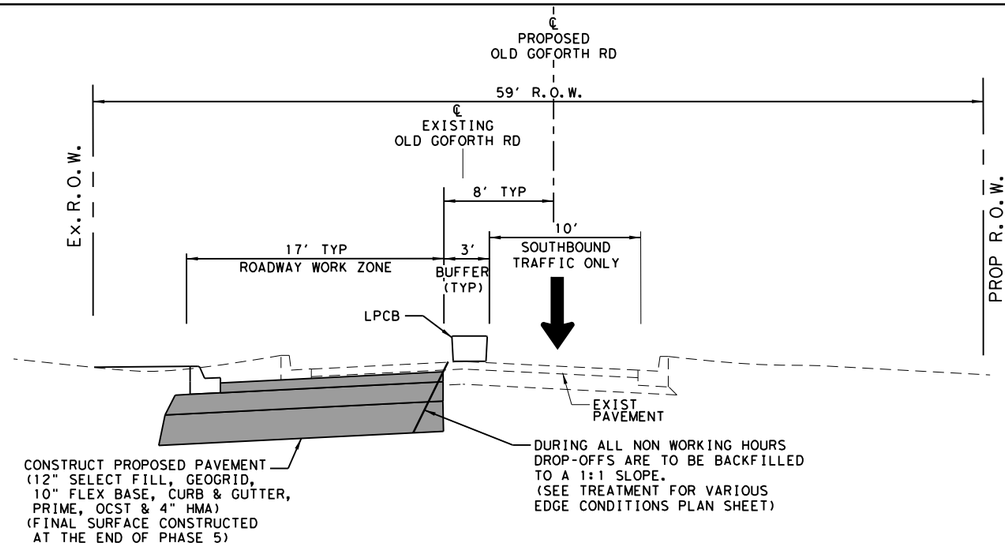
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 4 TYPICAL SECTIONS

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DRAWN BY:		37
CHECKED BY:		
APPROVED BY:		

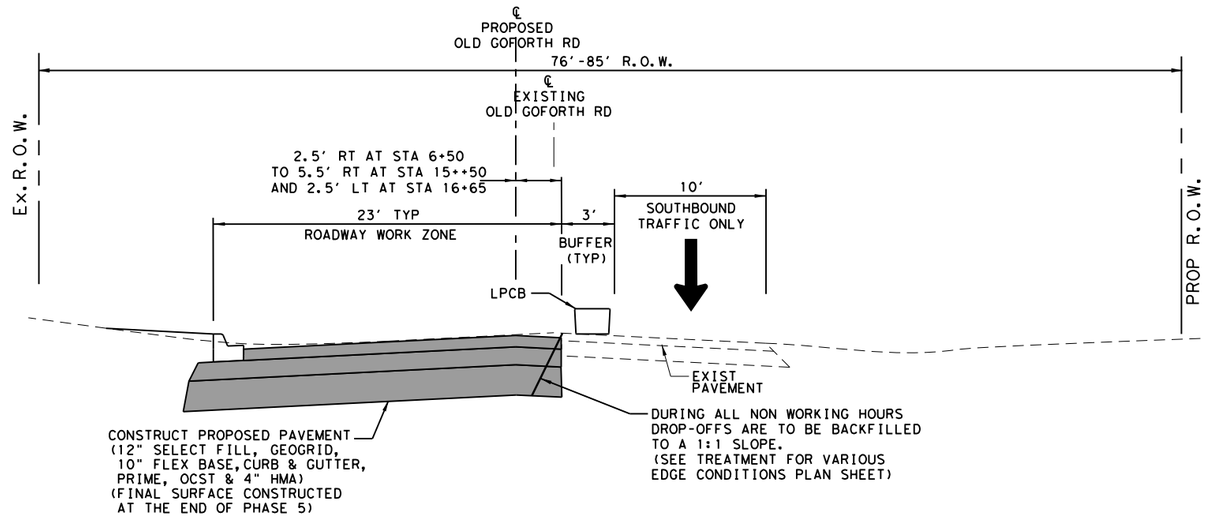
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PHASE 5 - STEP 1

STA 0+36 TO 3+65
(OLD GOFORTH ROAD)

CONTRACTOR MAY COMBINE PHASE 4 AND PHASE 5 CONSTRUCTION WITH APPROVAL FROM THE ENGINEER AND/OR CONSTRUCTION OBSERVER. SET-UP GOFORTH DETOUR, IF PHASE 5 CONSTRUCTION IS ALLOWED.



PHASE 5 - STEP 1

STA 3+65 TO 16+65
(OLD GOFORTH ROAD)

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

PRELIMINARY

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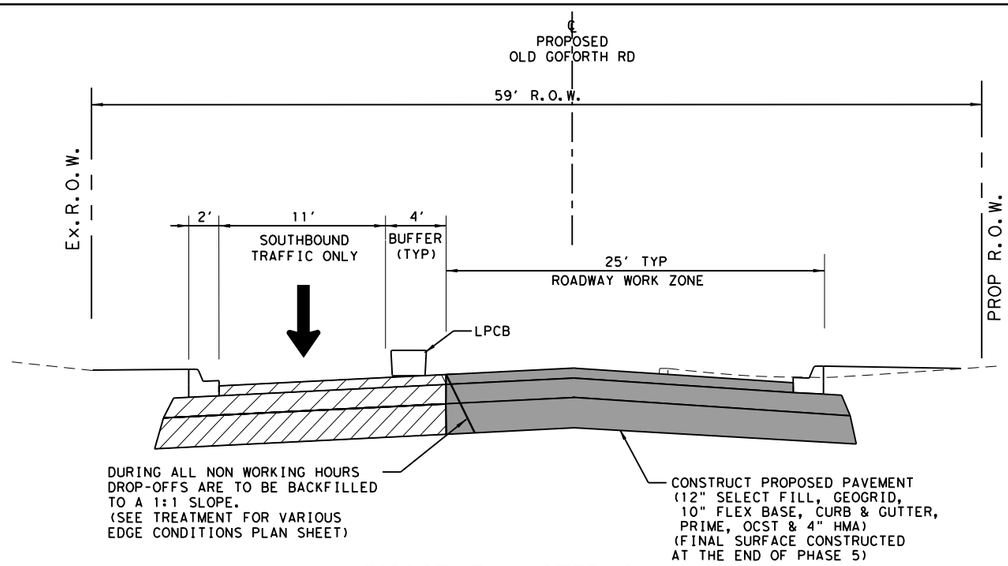
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 5 TYPICAL SECTIONS

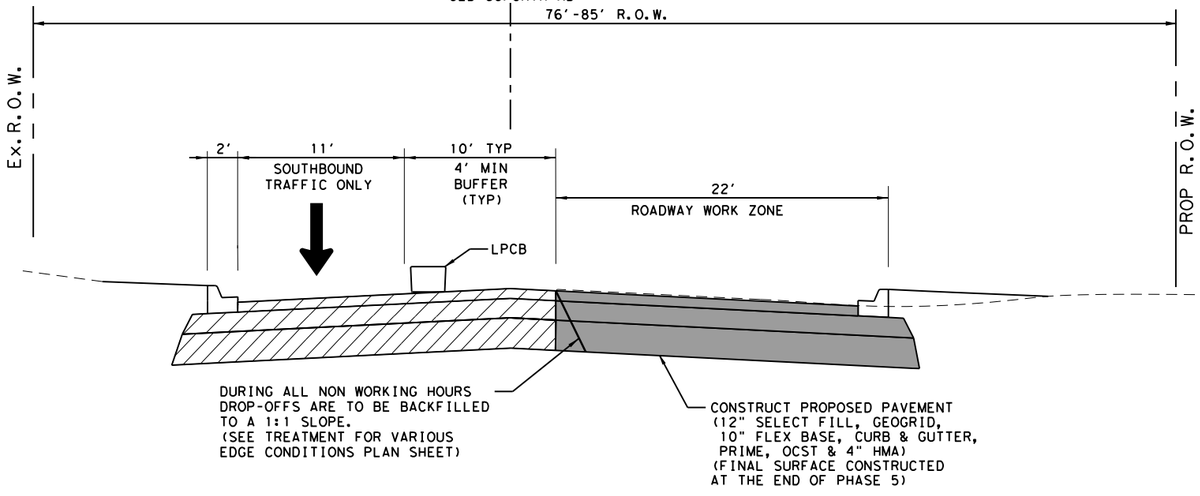
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PHASE 5 - STEP 2

STA 0+36 TO 3+65
(OLD GOFORTH ROAD)



PHASE 5 - STEP 2

STA 3+65 TO 16+65
(OLD GOFORTH ROAD)

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT
- BUILT PREVIOUSLY

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
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1/27/2023

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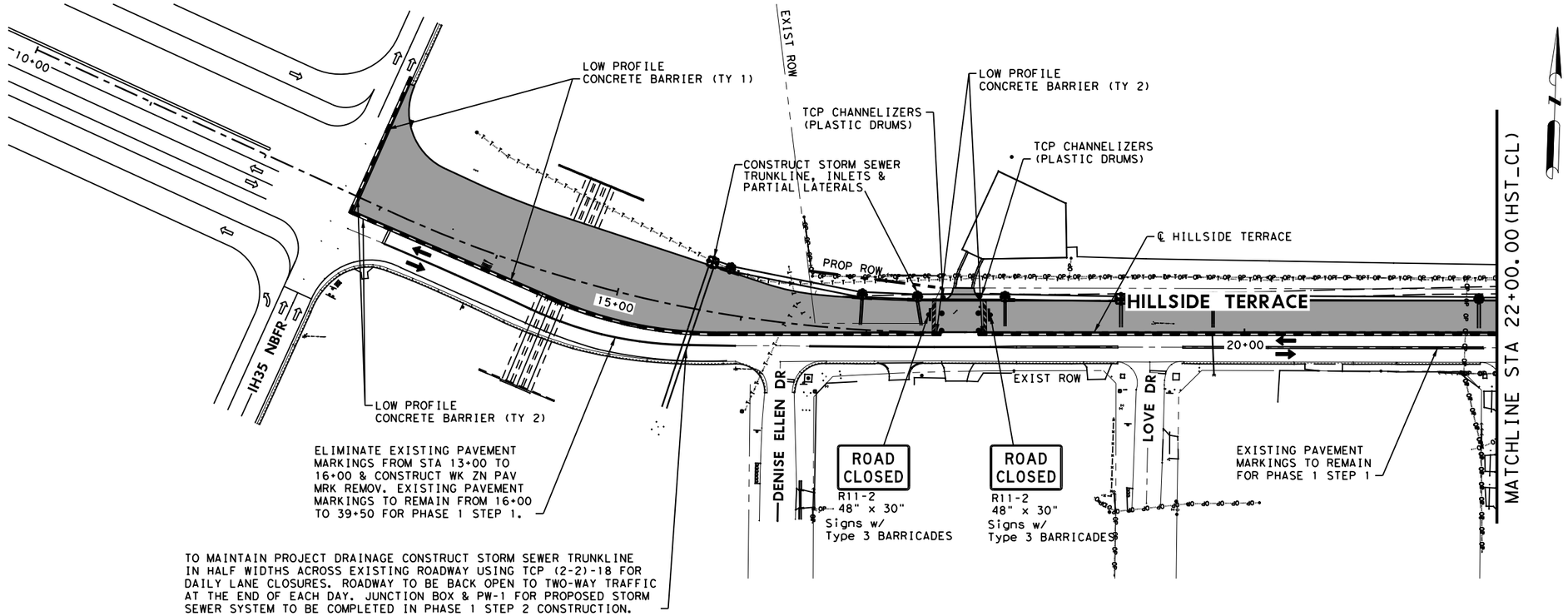
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HILLSIDE TERRACE

TRAFFIC CONTROL PHASE 5 TYPICAL SECTIONS

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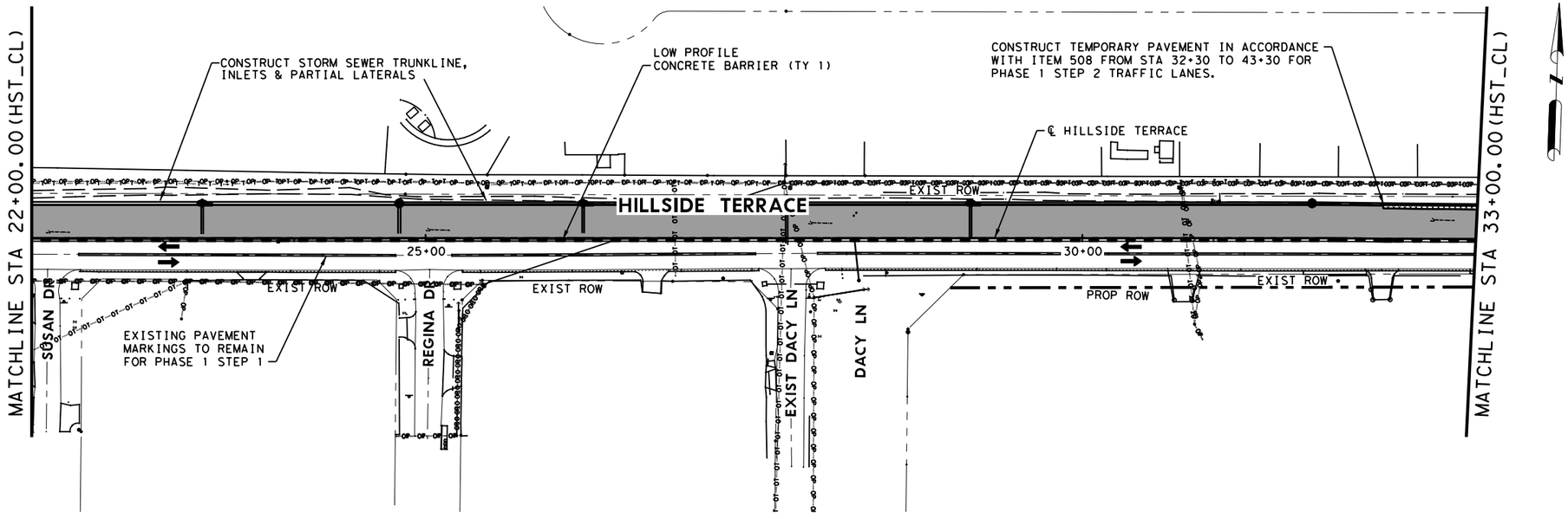


LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'



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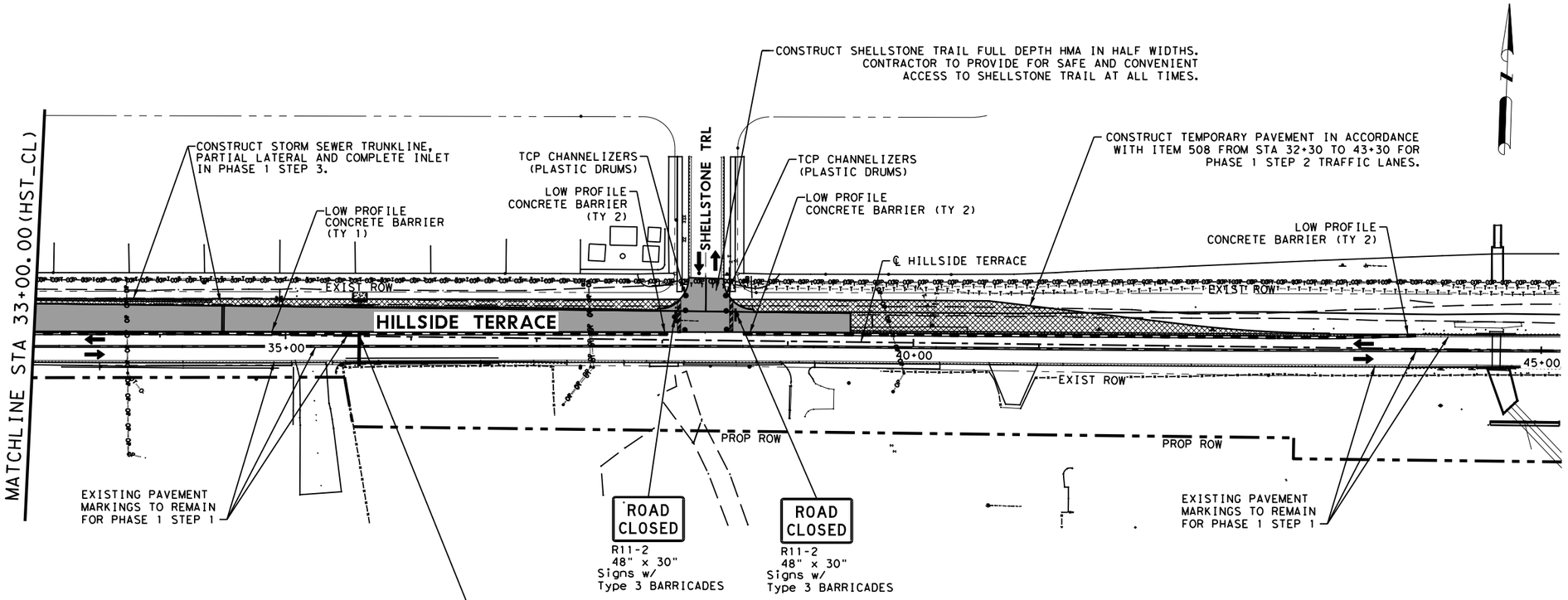
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TRAFFIC CONTROL PLAN PHASE 1 - STEP 1

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REMOVE EXISTING CULVERT & CONSTRUCT COMPLETE LENGTH OF PROPOSED CULVERT 02. TEMPORARILY CONSTRUCT LEFT SIDE OF THE CULVERT 2' LONGER TO ACCOMMODATE TEMPORARY PAVEMENT FOR PHASE 1 STEP 2 TCP LANES. REMOVE THE 2' AND COMPLETE HEADWALL IN PHASE 1 STEP 3 CONSTRUCTION. CONSTRUCT CULVERT 02 IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC.

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

PRELIMINARY

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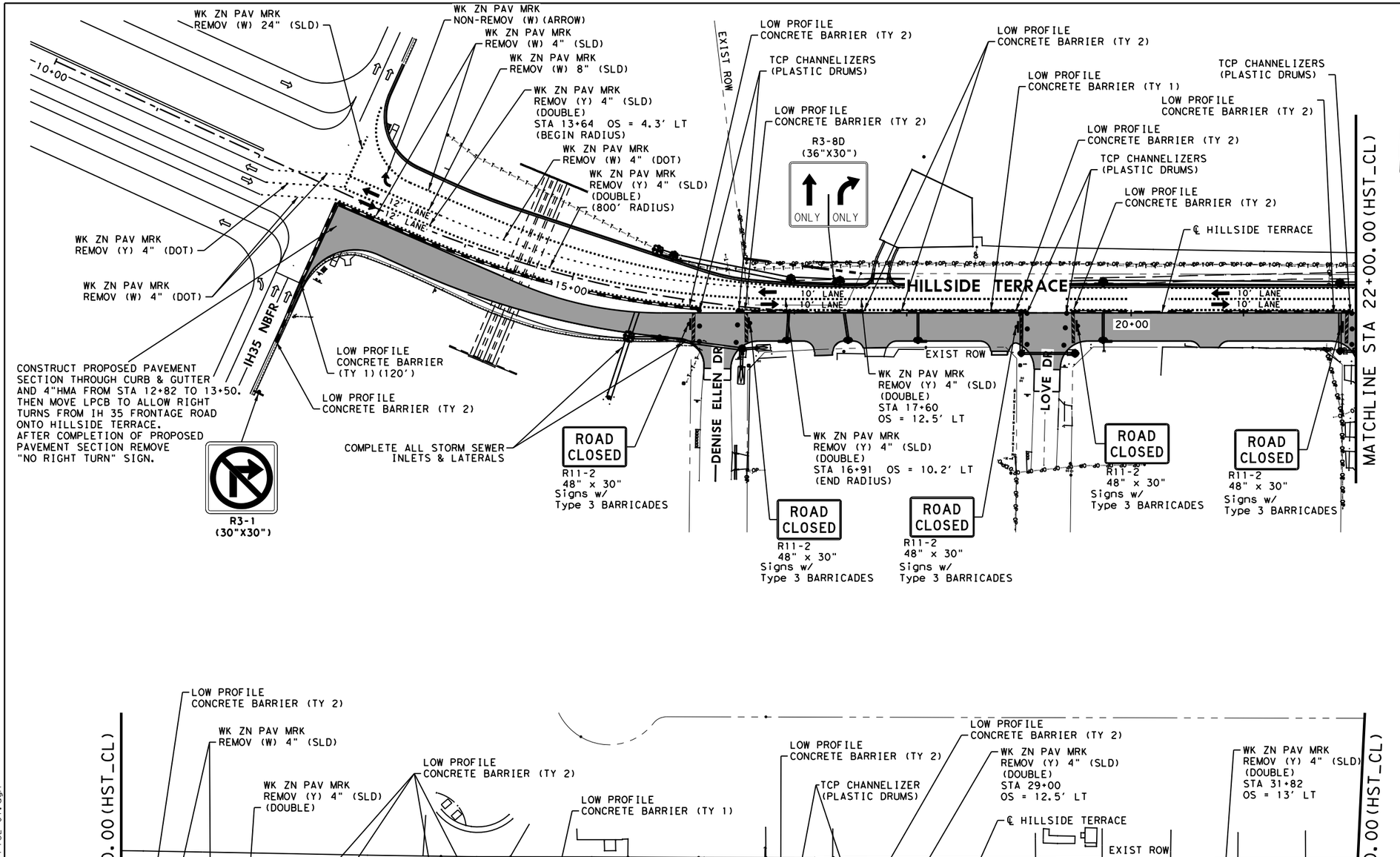
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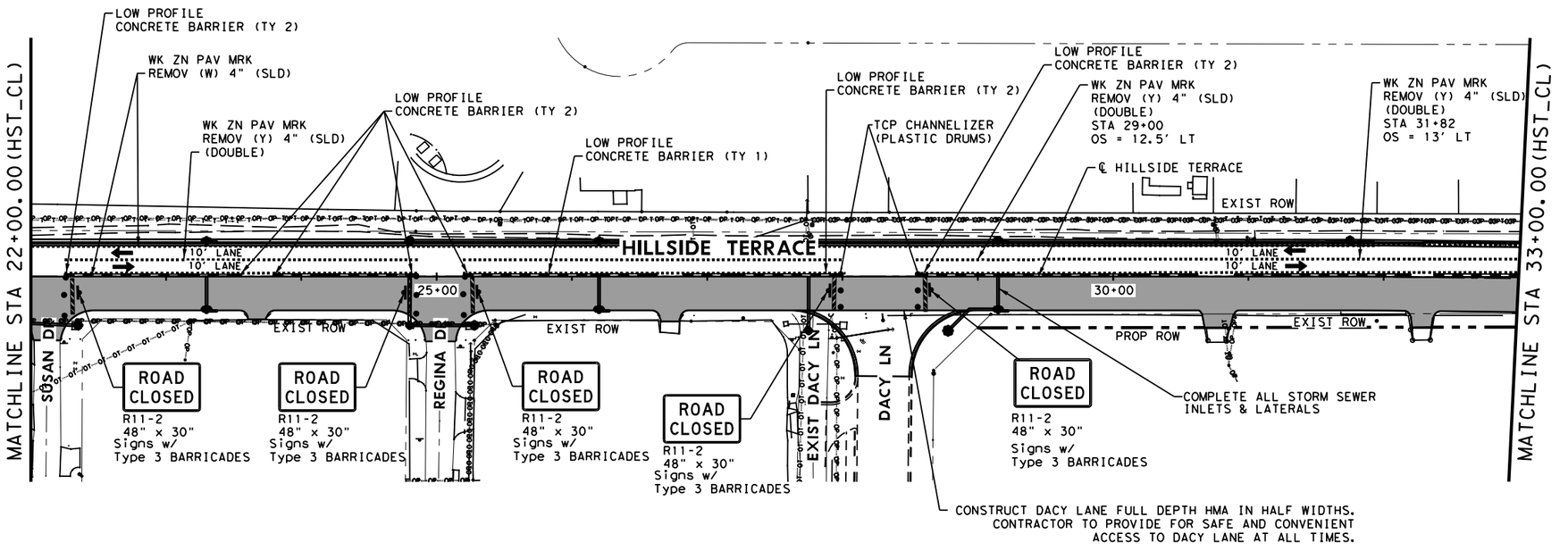
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TRAFFIC CONTROL PLAN PHASE 1 - STEP 1

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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

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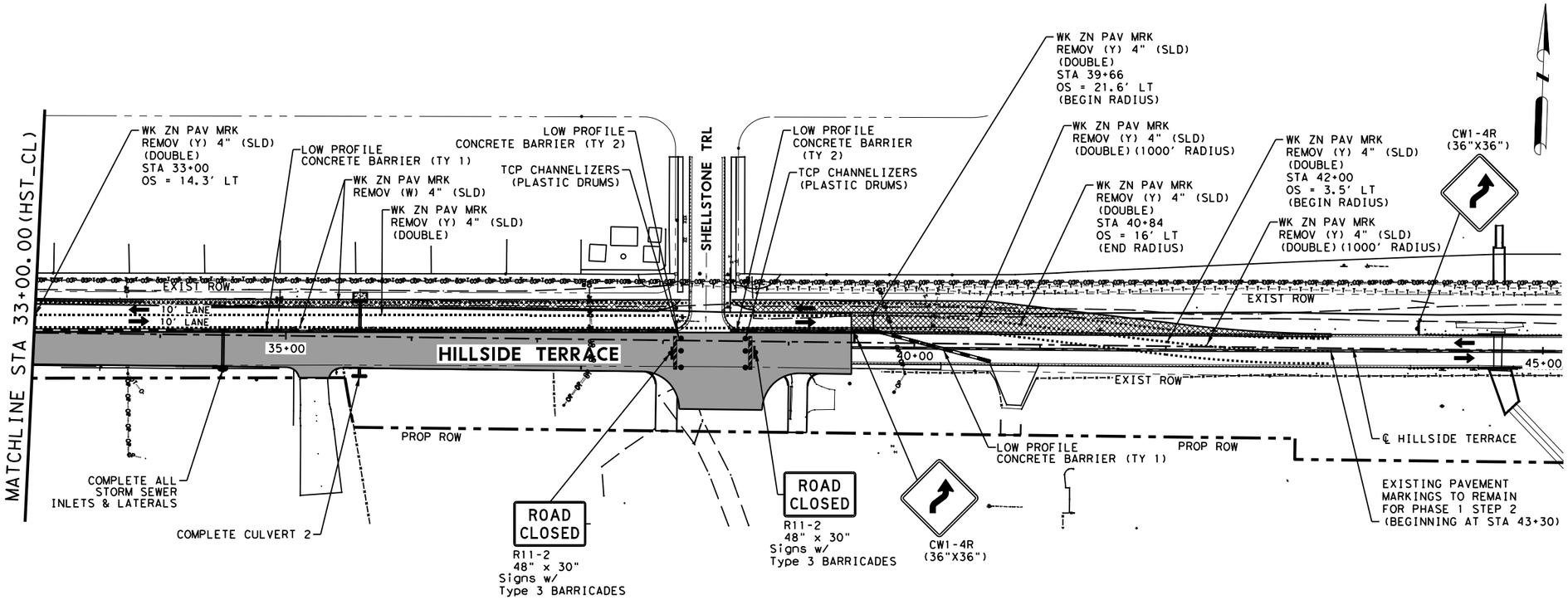
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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 1 - STEP 2

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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100

SCALE: 1"=100'

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HILLSIDE TERRACE

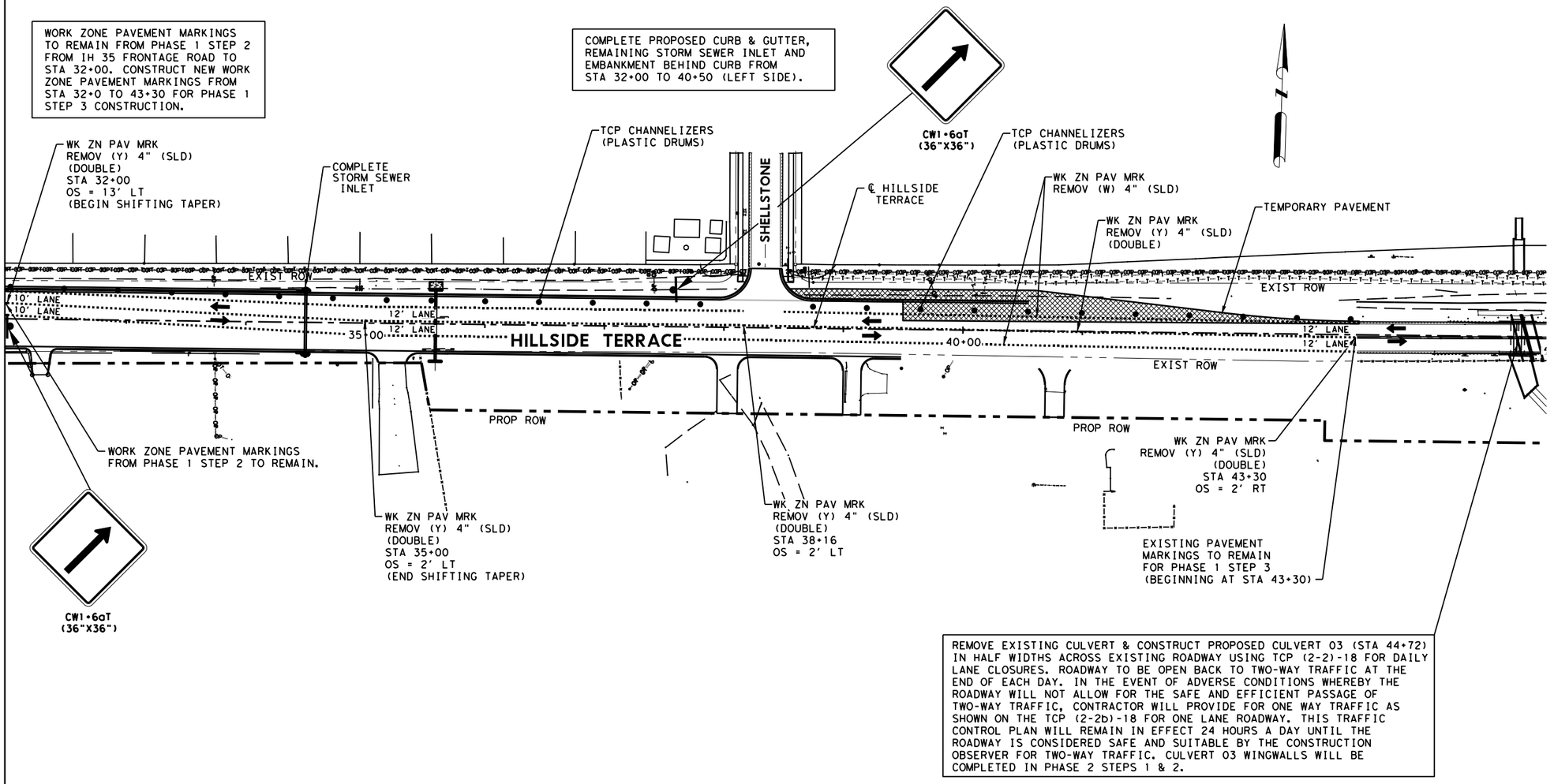
TRAFFIC CONTROL PLAN PHASE 1 - STEP 2

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WORK ZONE PAVEMENT MARKINGS TO REMAIN FROM PHASE 1 STEP 2 FROM IH 35 FRONTAGE ROAD TO STA 32+00. CONSTRUCT NEW WORK ZONE PAVEMENT MARKINGS FROM STA 32+0 TO 43+30 FOR PHASE 1 STEP 3 CONSTRUCTION.

COMPLETE PROPOSED CURB & GUTTER, REMAINING STORM SEWER INLET AND EMBANKMENT BEHIND CURB FROM STA 32+00 TO 40+50 (LEFT SIDE).



LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

REMOVE EXISTING CULVERT & CONSTRUCT PROPOSED CULVERT 03 (STA 44+72) IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC. CULVERT 03 WINGWALLS WILL BE COMPLETED IN PHASE 2 STEPS 1 & 2.

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HILLSIDE TERRACE

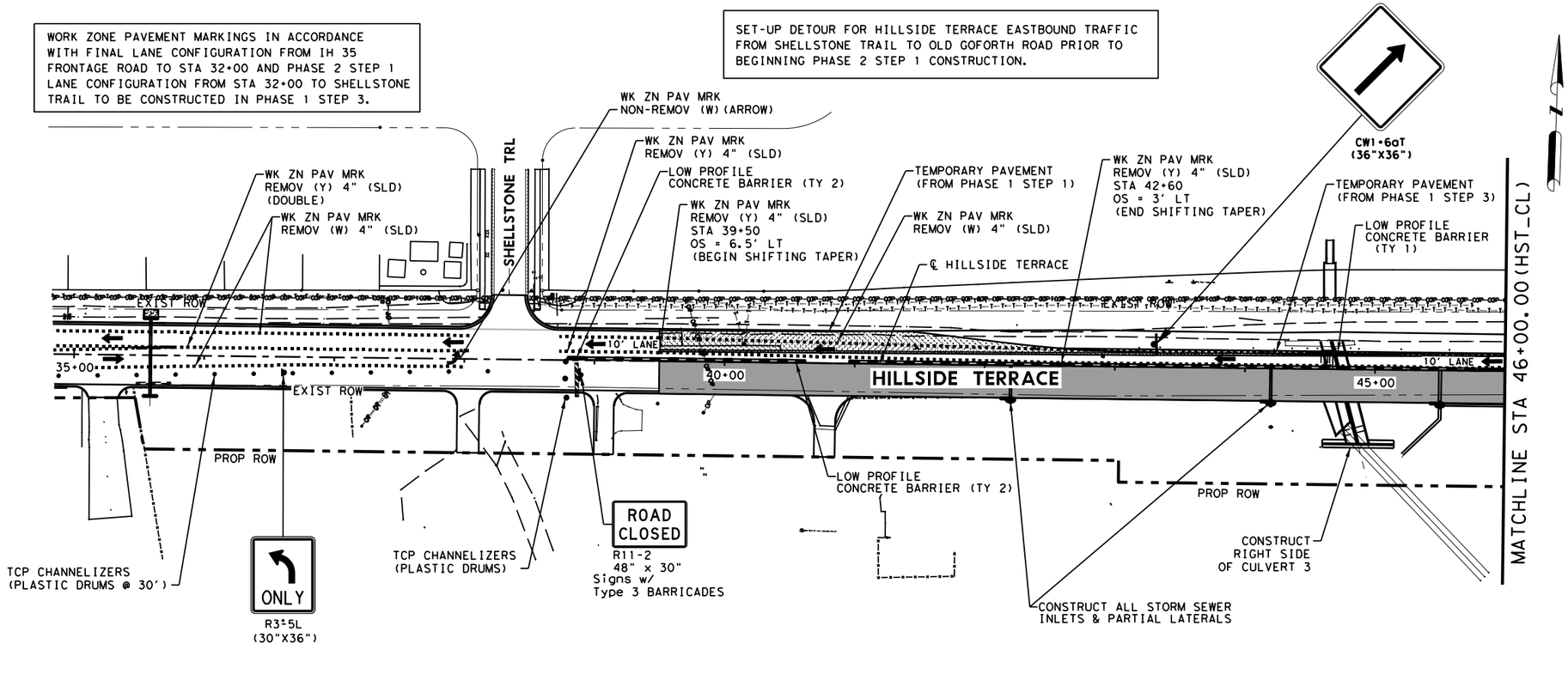
TRAFFIC CONTROL PLAN PHASE 1 - STEP 3

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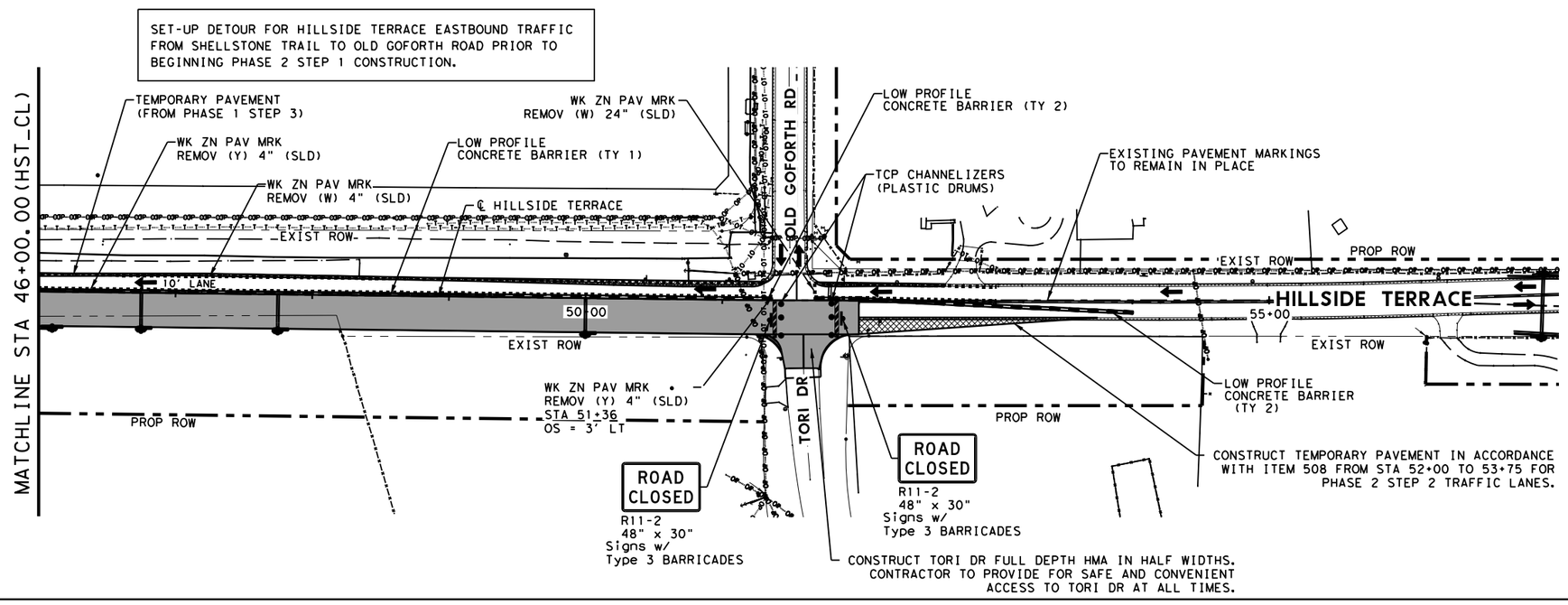
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WORK ZONE PAVEMENT MARKINGS IN ACCORDANCE WITH FINAL LANE CONFIGURATION FROM IH 35 FRONTAGE ROAD TO STA 32+00 AND PHASE 2 STEP 1 LANE CONFIGURATION FROM STA 32+00 TO SHELLSTONE TRAIL TO BE CONSTRUCTED IN PHASE 1 STEP 3.

SET-UP DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM SHELLSTONE TRAIL TO OLD GOFORTH ROAD PRIOR TO BEGINNING PHASE 2 STEP 1 CONSTRUCTION.



SET-UP DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM SHELLSTONE TRAIL TO OLD GOFORTH ROAD PRIOR TO BEGINNING PHASE 2 STEP 1 CONSTRUCTION.



LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
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7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

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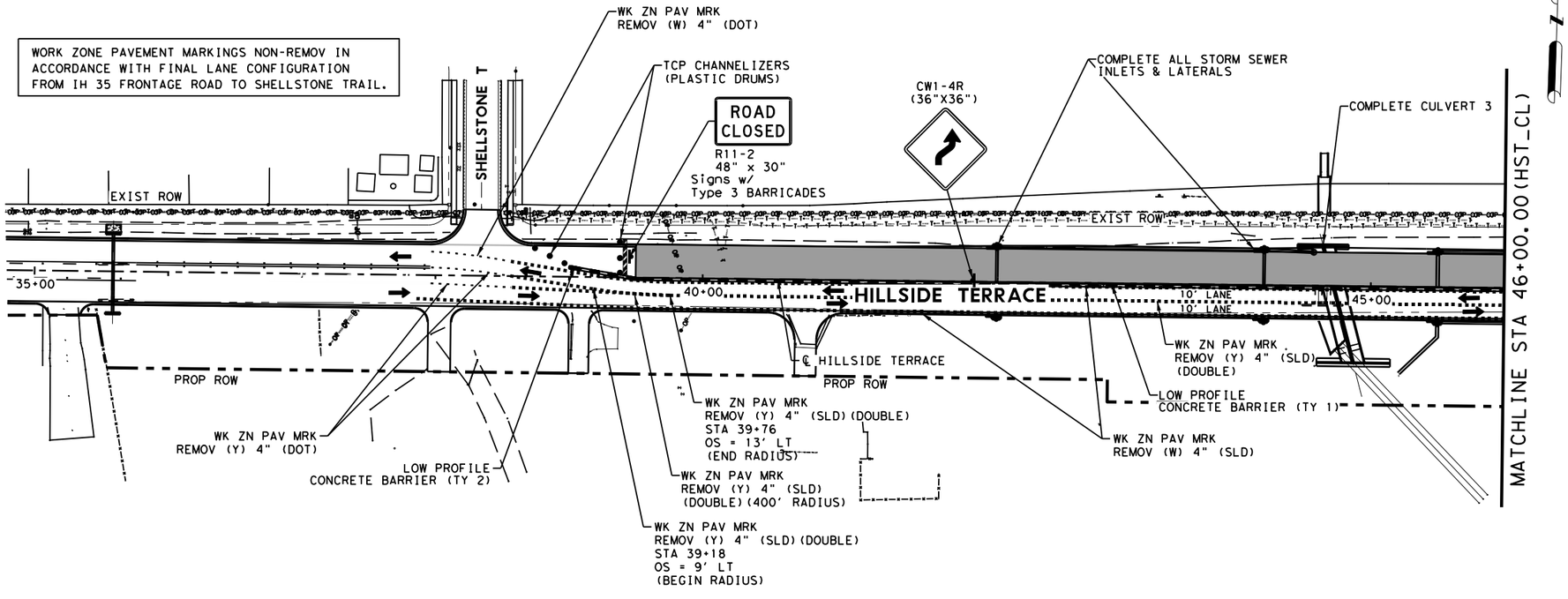
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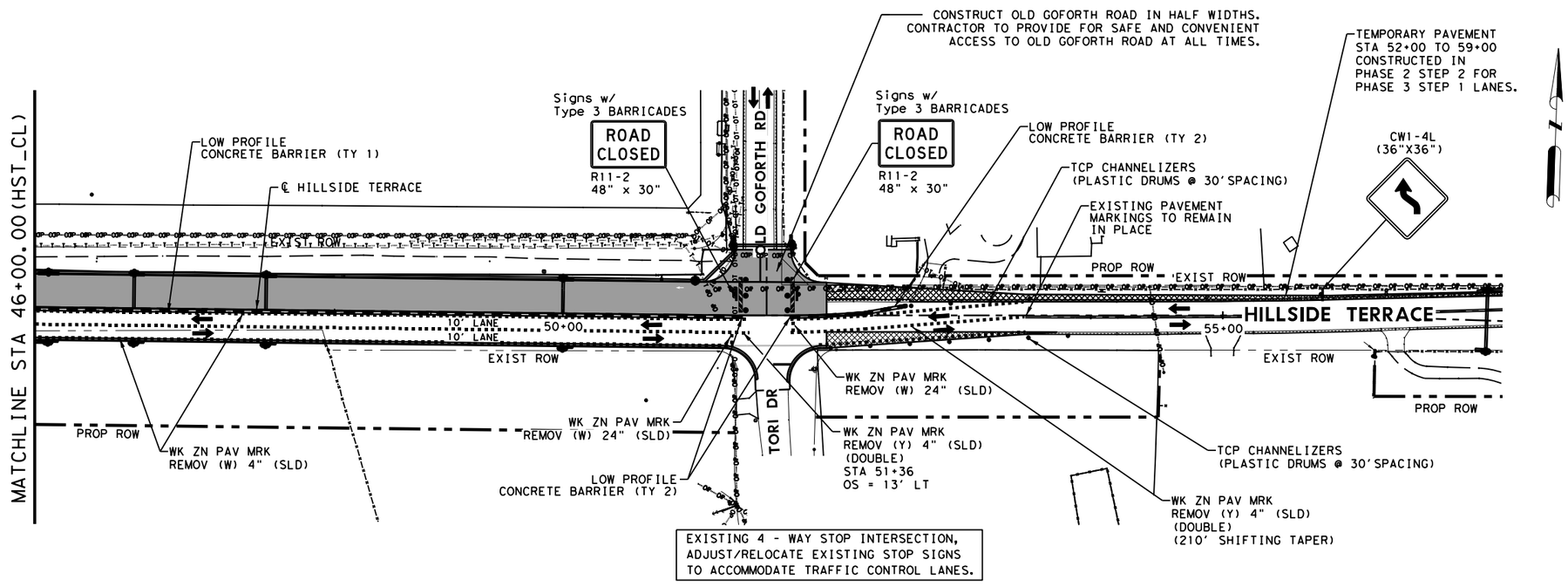
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 2 - STEP 1

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EXISTING 4 - WAY STOP INTERSECTION, ADJUST/RELOCATE EXISTING STOP SIGNS TO ACCOMMODATE TRAFFIC CONTROL LANES.

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
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0 50 100
SCALE: 1"=100'

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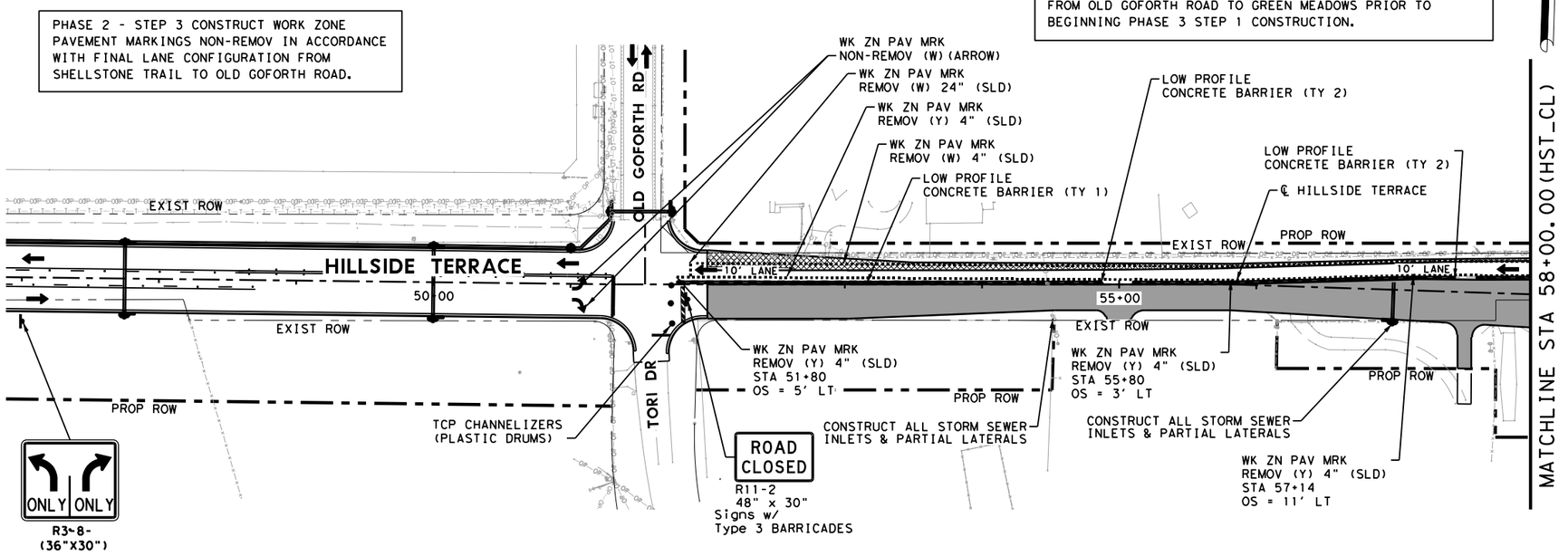
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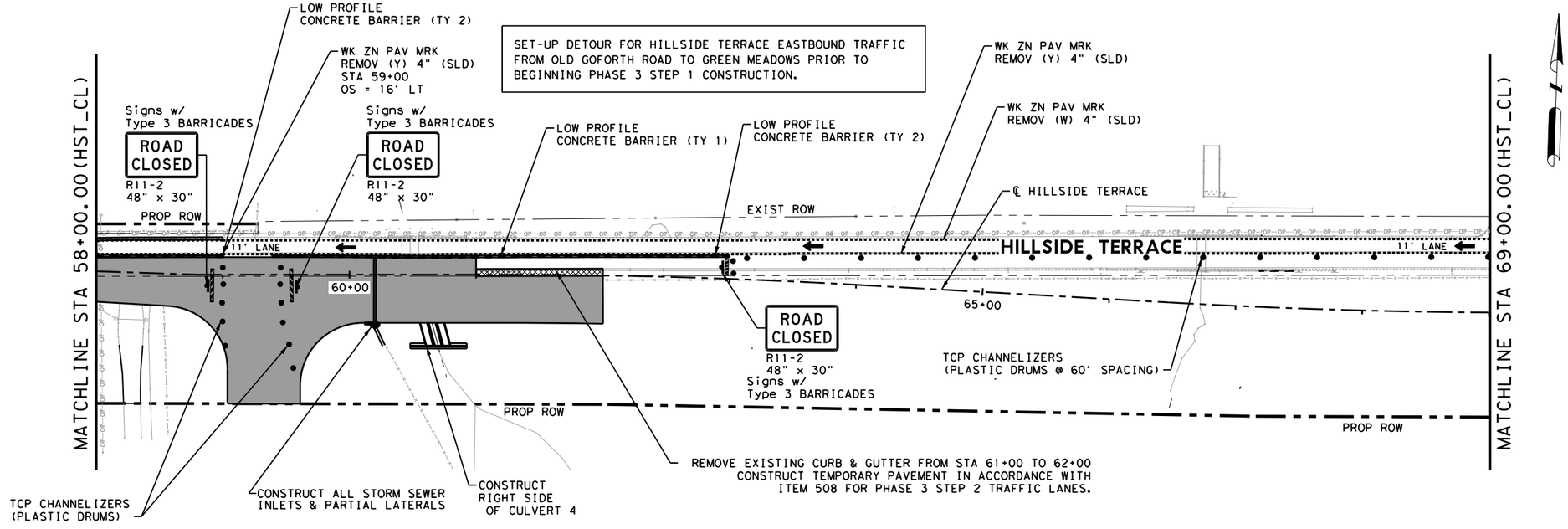
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 2 - STEP 2

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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
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3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
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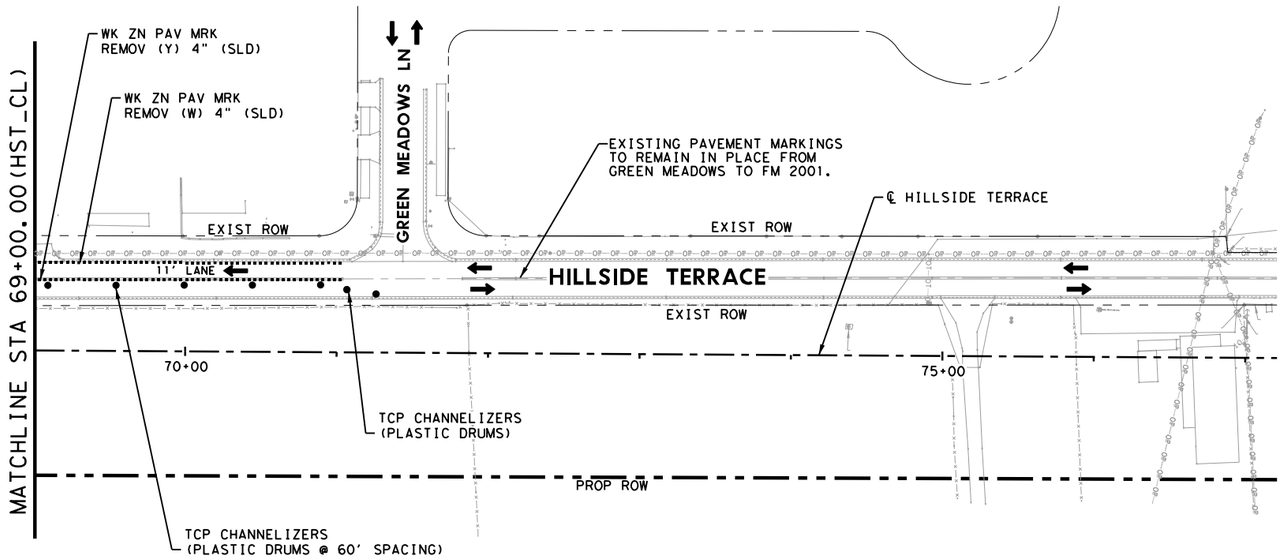
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 3 - STEP 1

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SET-UP DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM OLD GOFORTH ROAD TO GREEN MEADOWS PRIOR TO BEGINNING PHASE 3 STEP 1 CONSTRUCTION.



LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
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7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

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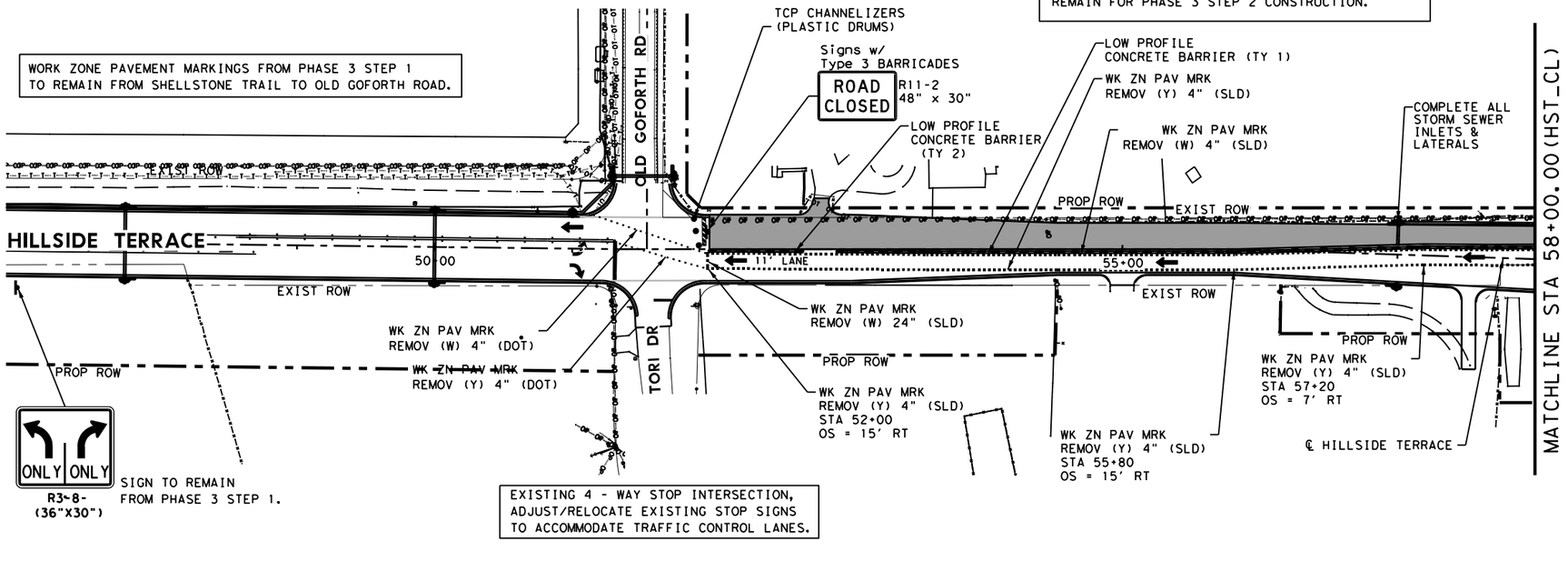
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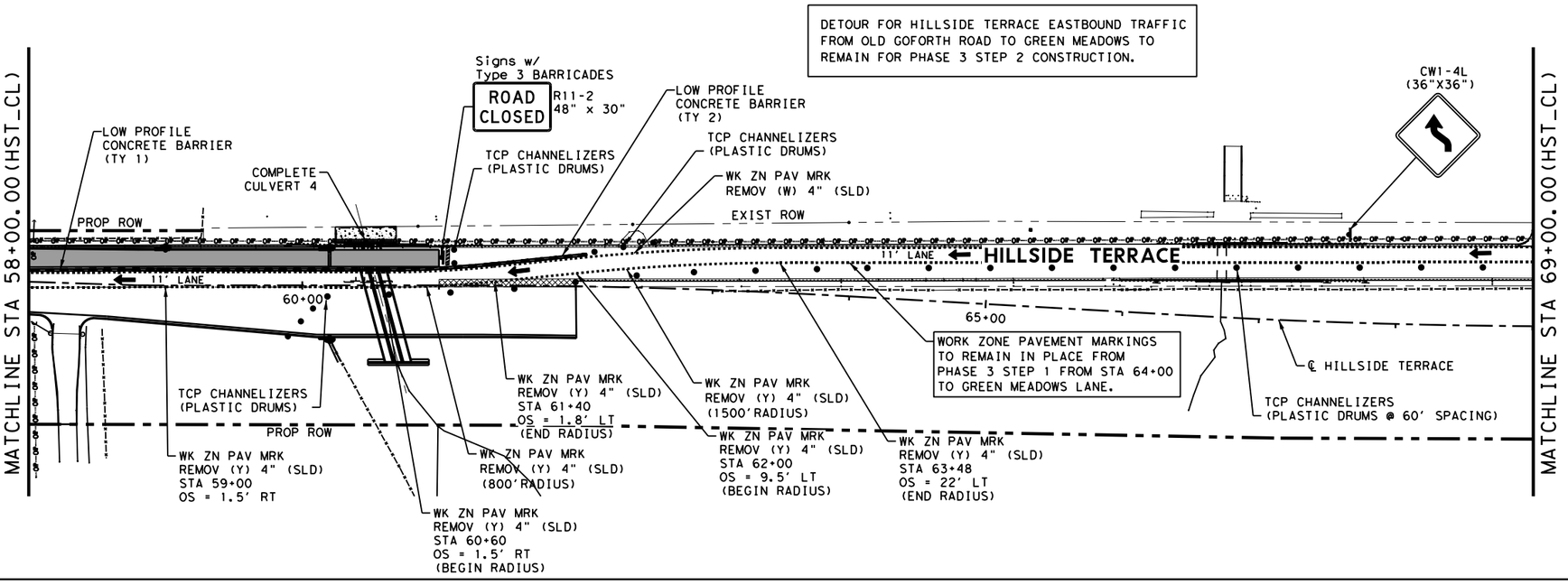
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 3 - STEP 1

DESIGNED BY:		SHEET 2 OF 2
DRAWN BY:		49
CHECKED BY:		
APPROVED BY:		

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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
1. MAINTAIN ACCESS TO ALL INTERSECTIONS AND DRIVEWAYS AT ALL TIMES UNLESS OTHERWISE NOTED.
2. SEE TCP SEQUENCE OF WORK.
3. SEE BC, TCP, AND WZ STANDARDS FOR TEMPORARY SIGNING AND PAVEMENT MARKING DETAILS.
4. SEE P&P SHEETS AND INTERSECTION LAYOUTS FOR ADDITIONAL INFORMATION.
5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
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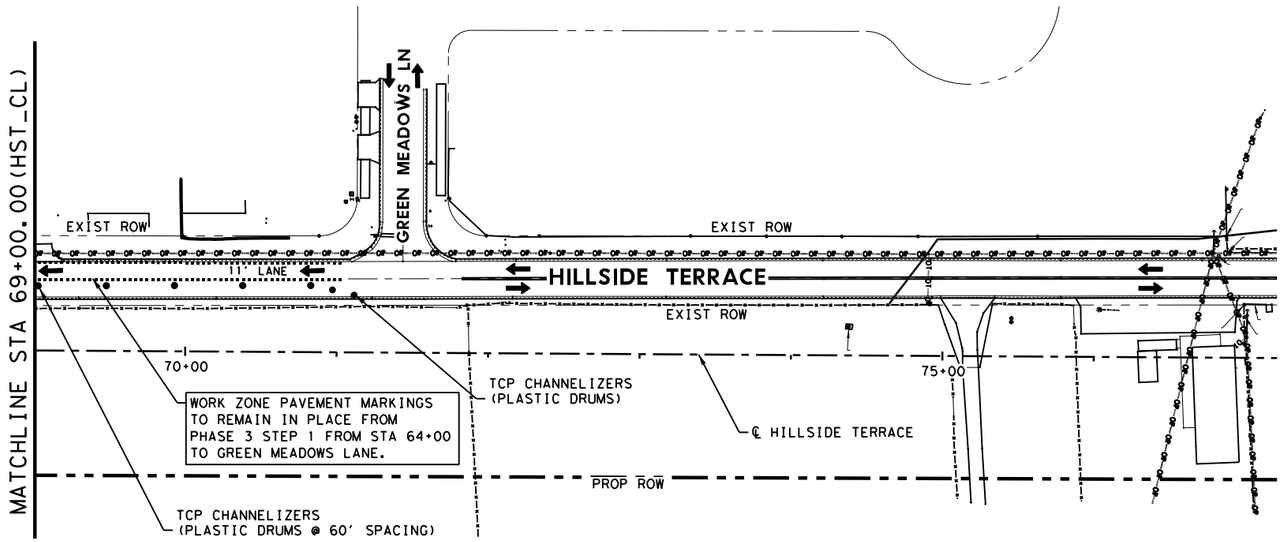
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 3 - STEP 2

DESIGNED BY:		SHEET 1 OF 2
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APPROVED BY:		

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DETOUR FOR HILLSIDE TERRACE EASTBOUND TRAFFIC FROM OLD GOFORTH ROAD TO GREEN MEADOWS TO REMAIN FOR PHASE 3 STEP 2 CONSTRUCTION.



LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

NOTES:
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SCALE: 1"=100'

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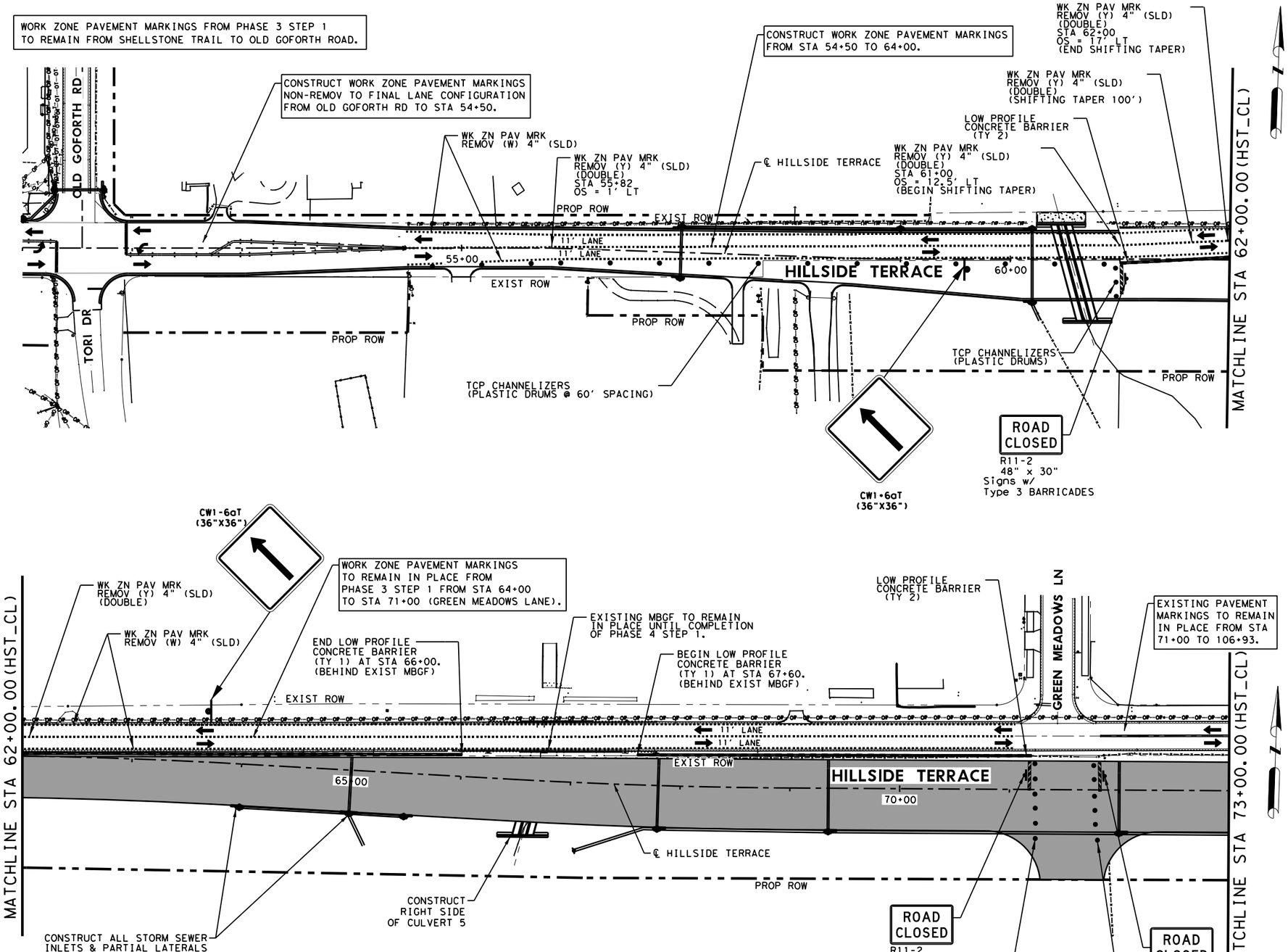
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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 3 - STEP 2

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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

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SCALE: 1"=100'

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HAYS COUNTY STATE OF TEXAS

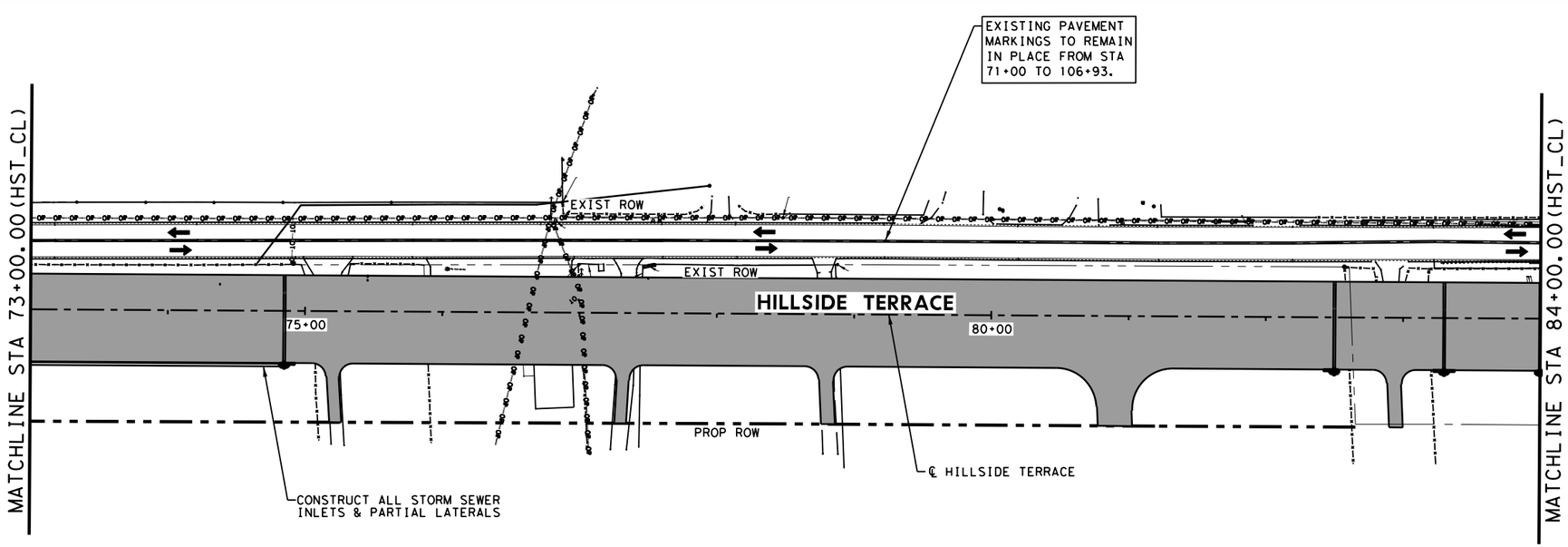
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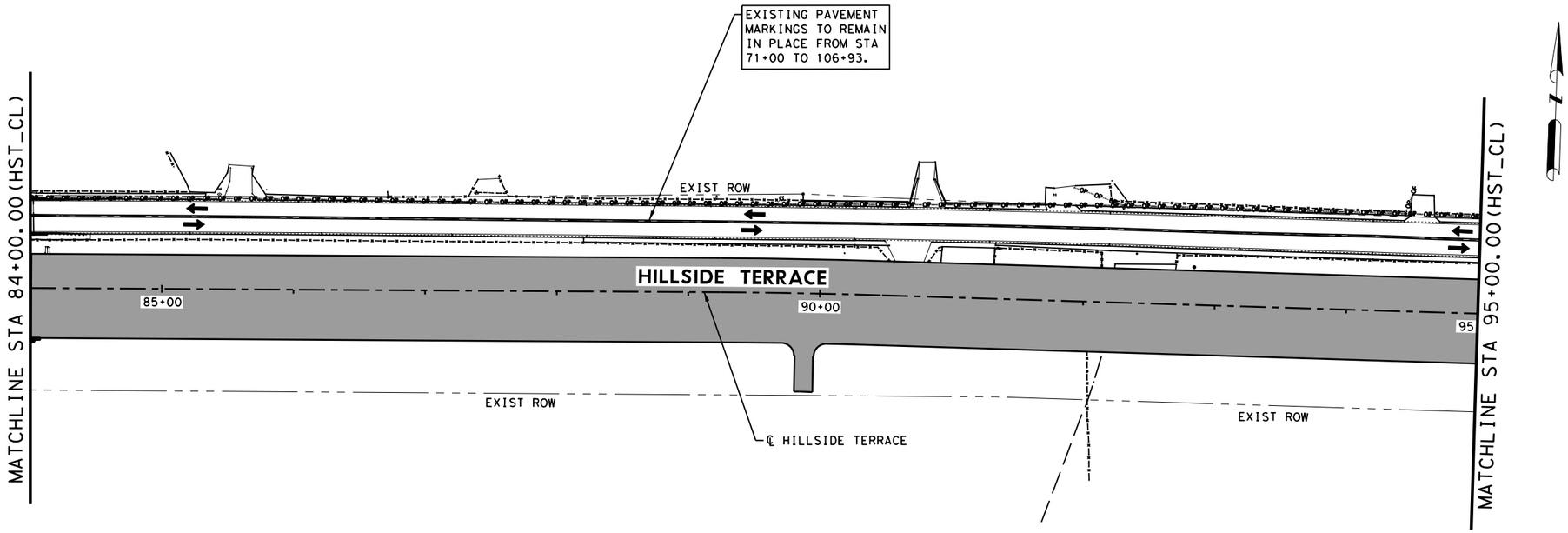
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 4 - STEP 1

DESIGNED BY:		SHEET 1 OF 3
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LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

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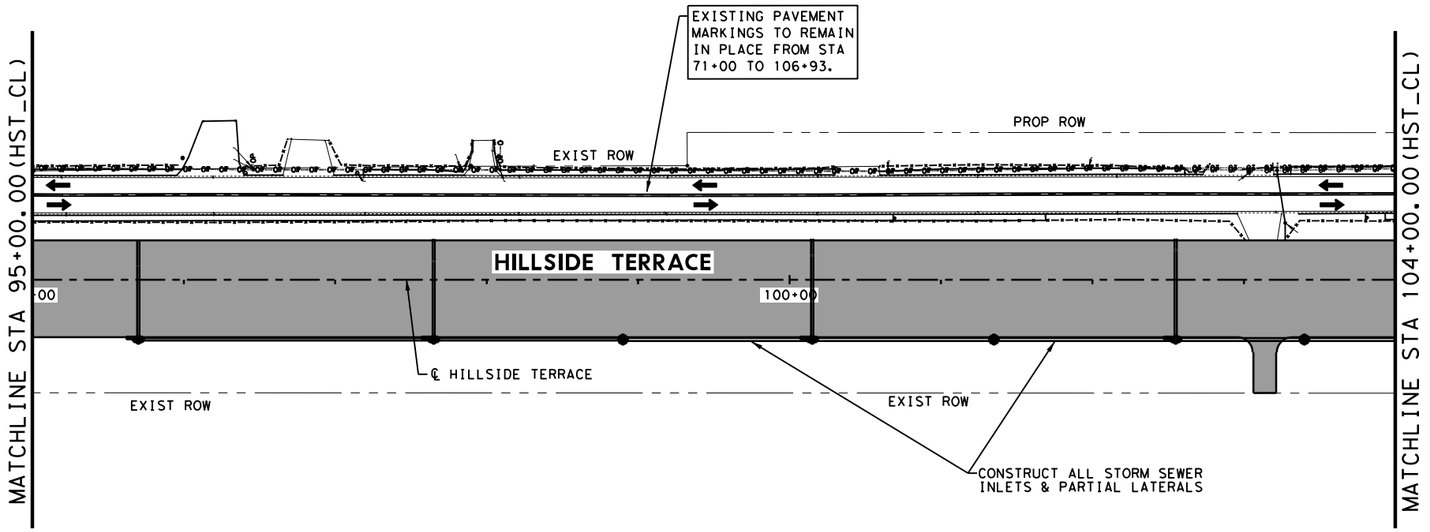
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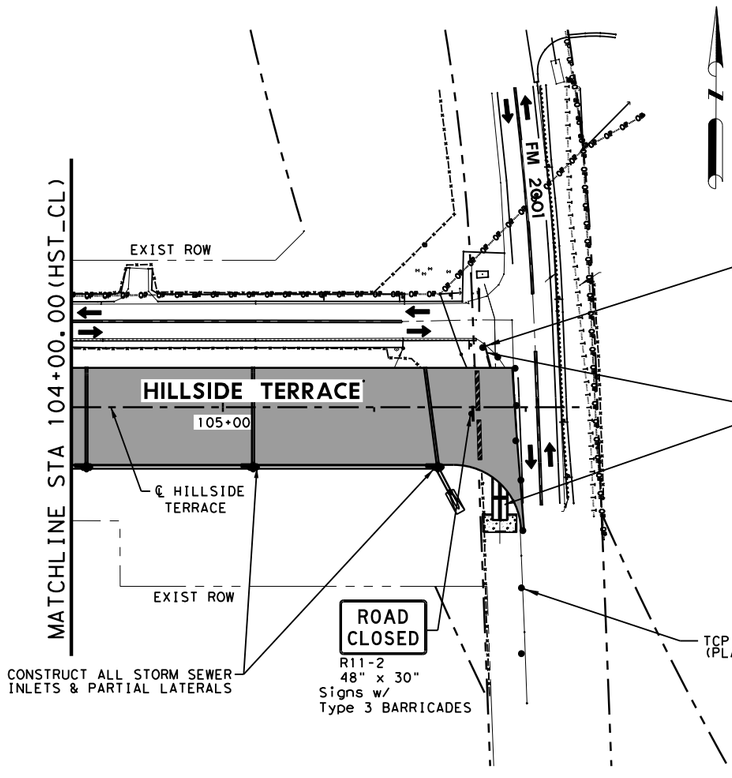
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 4 - STEP 1

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REMOVE EXISTING CULVERT 07 & CONSTRUCT COMPLETE LENGTH OF PROPOSED CULVERT 07. TEMPORARILY CONSTRUCT LEFT SIDE OF THE CULVERT 16' LONGER TO BE OUTSIDE EXISTING ROADWAY. REMOVE THE 16' & COMPLETE END TREATMENT IN PHASE 4 STEP 2. CONSTRUCT CULVERT 07 IN HALF WIDTHS ACROSS EXISTING ROADWAY USING TCP (2-2)-18 FOR DAILY LANE CLOSURES. ROADWAY TO BE OPEN BACK TO TWO-WAY TRAFFIC AT THE END OF EACH DAY. IN THE EVENT OF ADVERSE CONDITIONS WHEREBY THE ROADWAY WILL NOT ALLOW FOR THE SAFE AND EFFICIENT PASSAGE OF TWO-WAY TRAFFIC, CONTRACTOR WILL PROVIDE FOR ONE WAY TRAFFIC AS SHOWN ON THE TCP (2-2b)-18 FOR ONE LANE ROADWAY. THIS TRAFFIC CONTROL PLAN WILL REMAIN IN EFFECT 24 HOURS A DAY UNTIL THE ROADWAY IS CONSIDERED SAFE AND SUITABLE BY THE CONSTRUCTION OBSERVER FOR TWO-WAY TRAFFIC.

LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

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0 50 100
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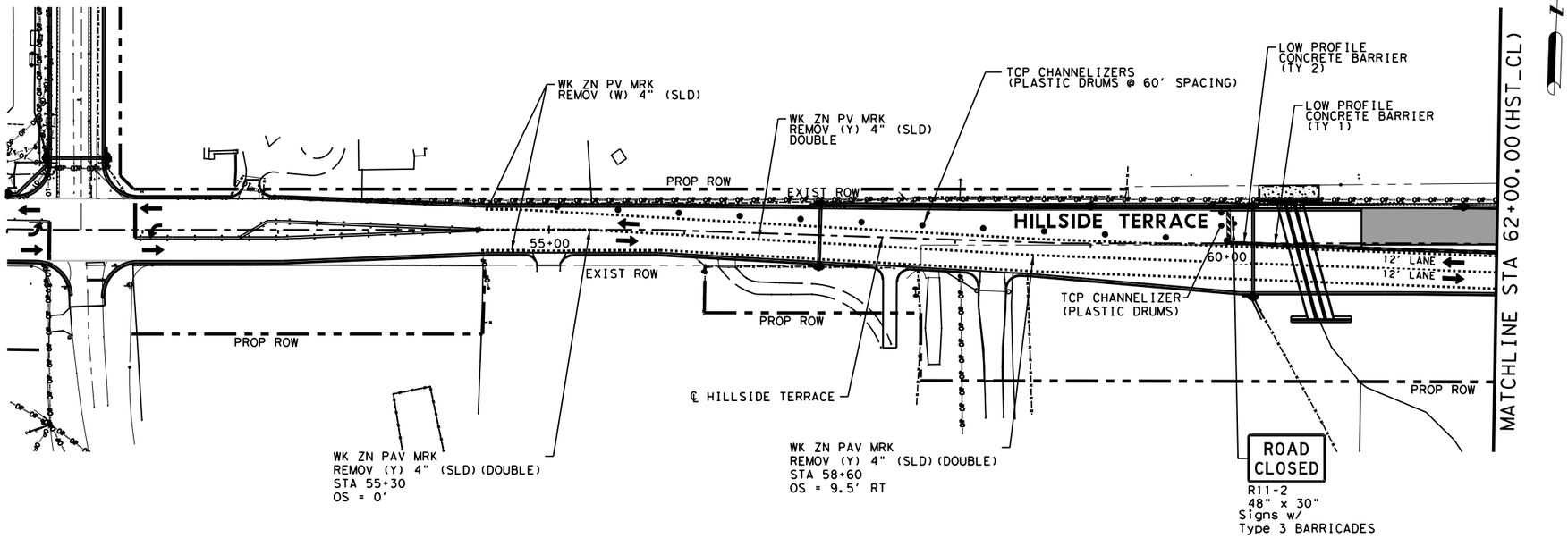
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 4 - STEP 1

DESIGNED BY:		SHEET 3 OF 3
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APPROVED BY:		

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WORK ZONE PAVEMENT MARKINGS FROM PHASE 3 STEP 1 TO REMAIN FROM SHELLSTONE TRAIL TO OLD GOFORTH ROAD AND FROM OLD GOFORTH ROAD TO STA 54+50 FROM PHASE 4 STEP 1



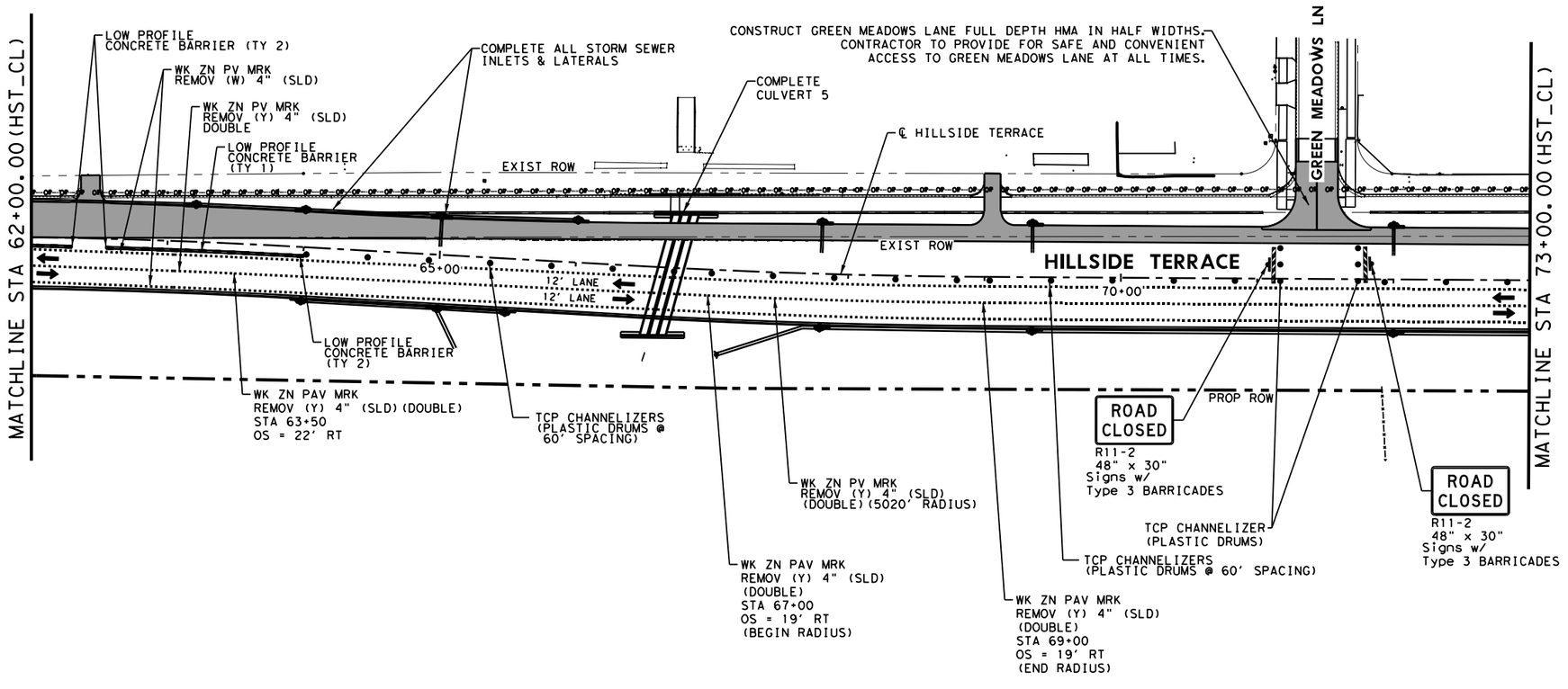
LEGEND

- DIRECTION OF TRAFFIC
- CONSTRUCTION THIS PHASE
- TEMPORARY PAVEMENT

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0 50 100

SCALE: 1"=100'



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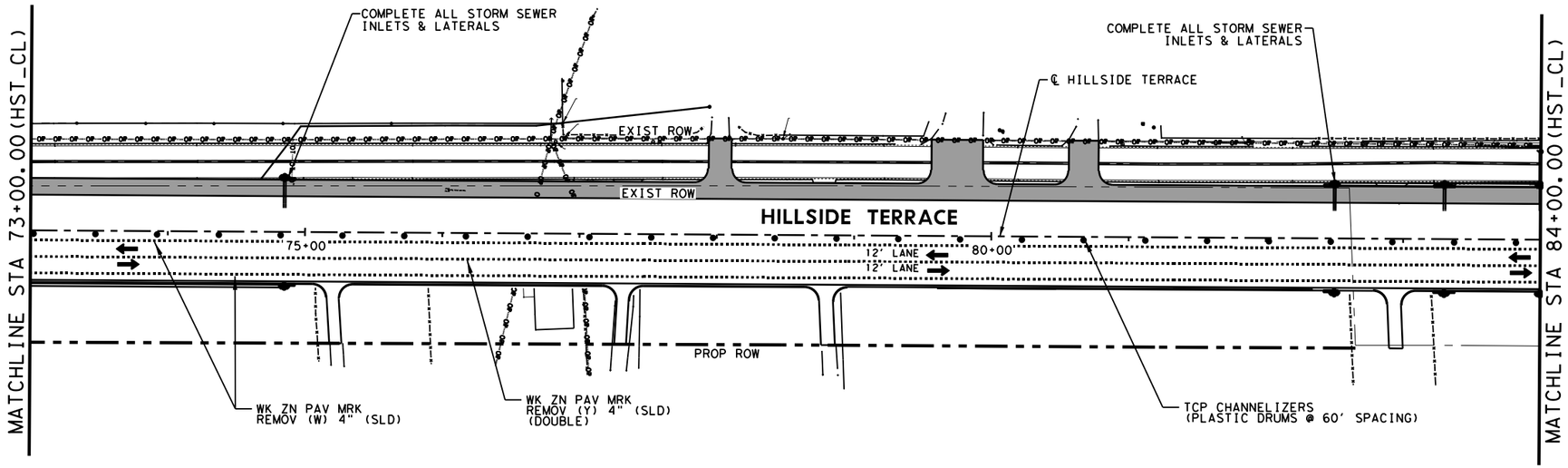
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HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 4 - STEP 2

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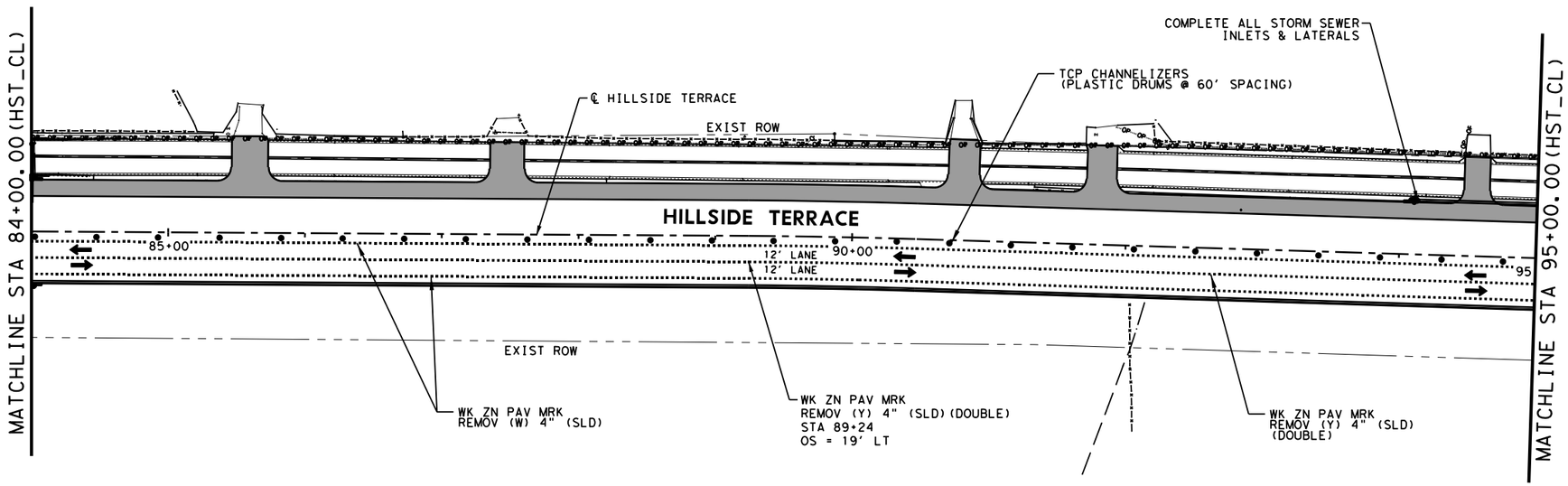
LEGEND

- DIRECTION OF TRAFFIC
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NOTES:
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0 50 100

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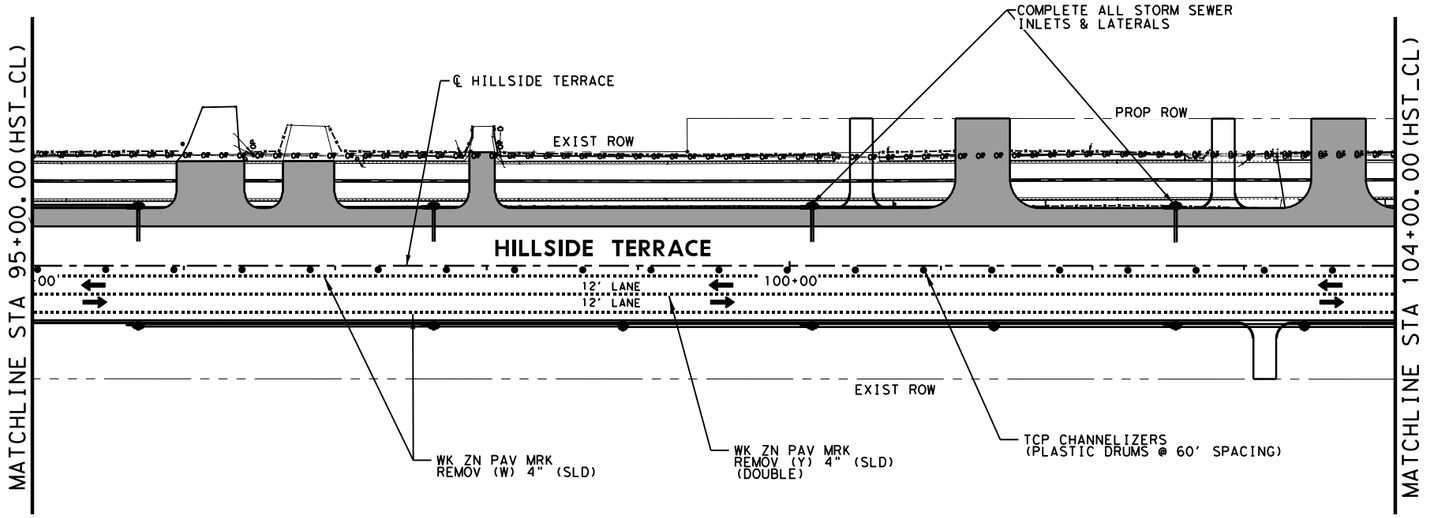
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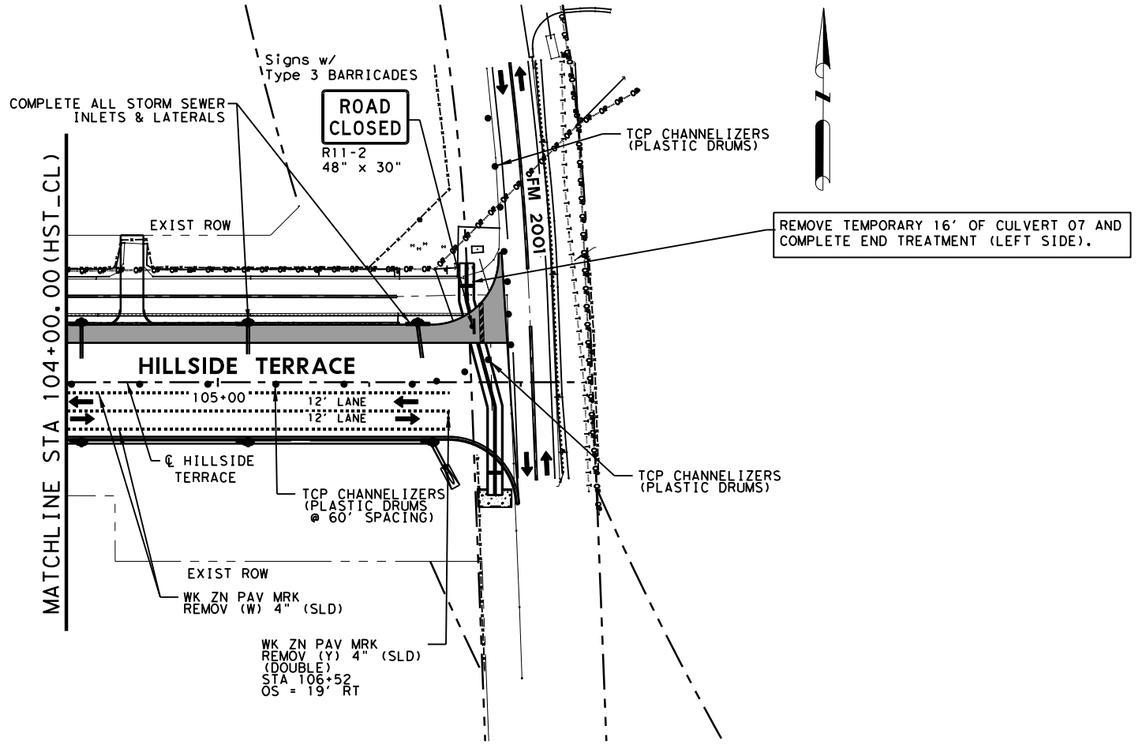
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 4 - STEP 2

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LEGEND

- DIRECTION OF TRAFFIC
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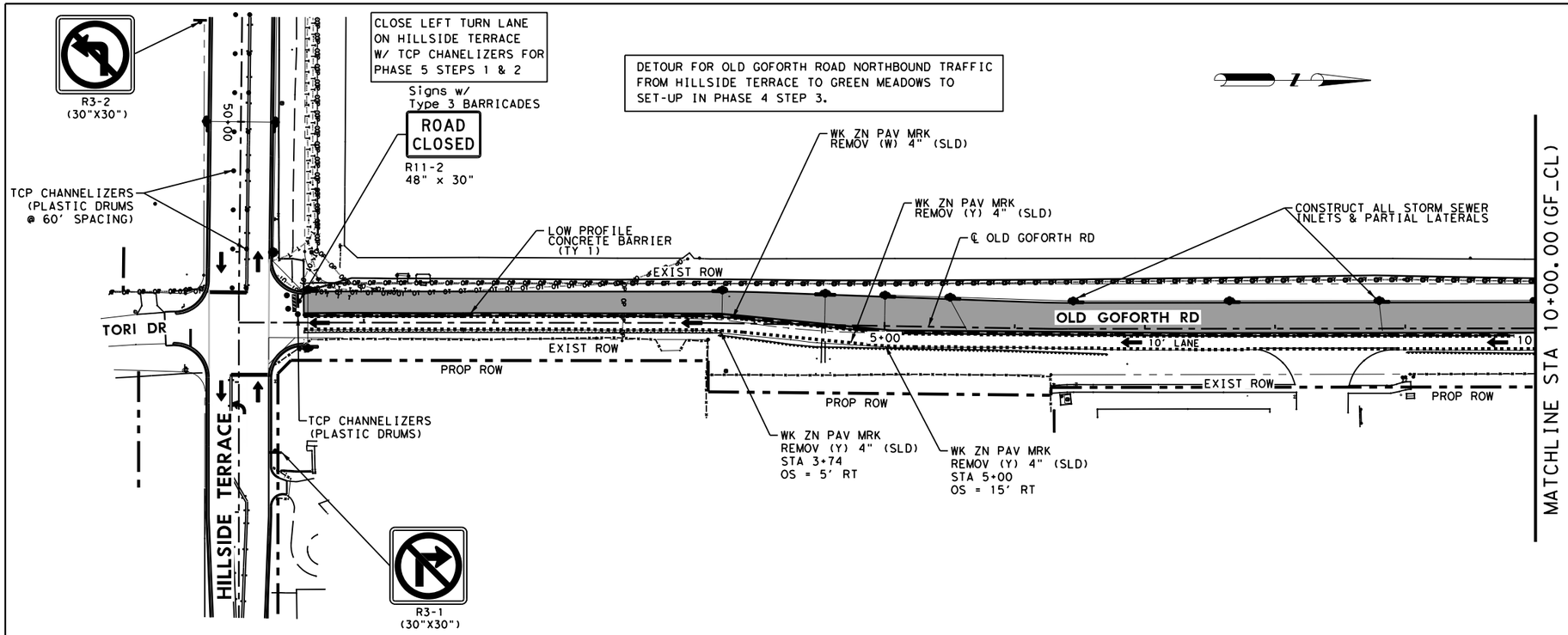
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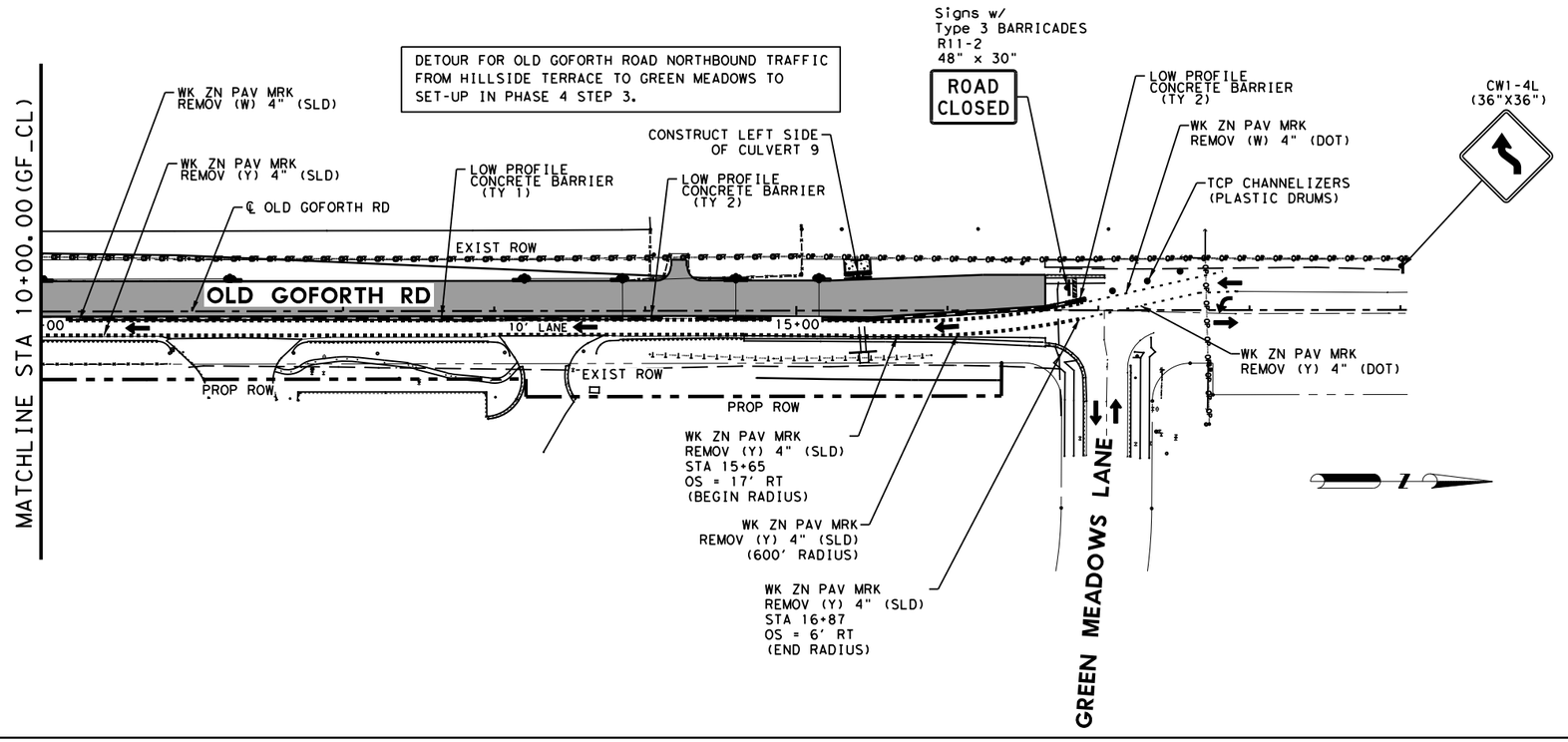
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TRAFFIC CONTROL PLAN PHASE 4 - STEP 2

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LEGEND

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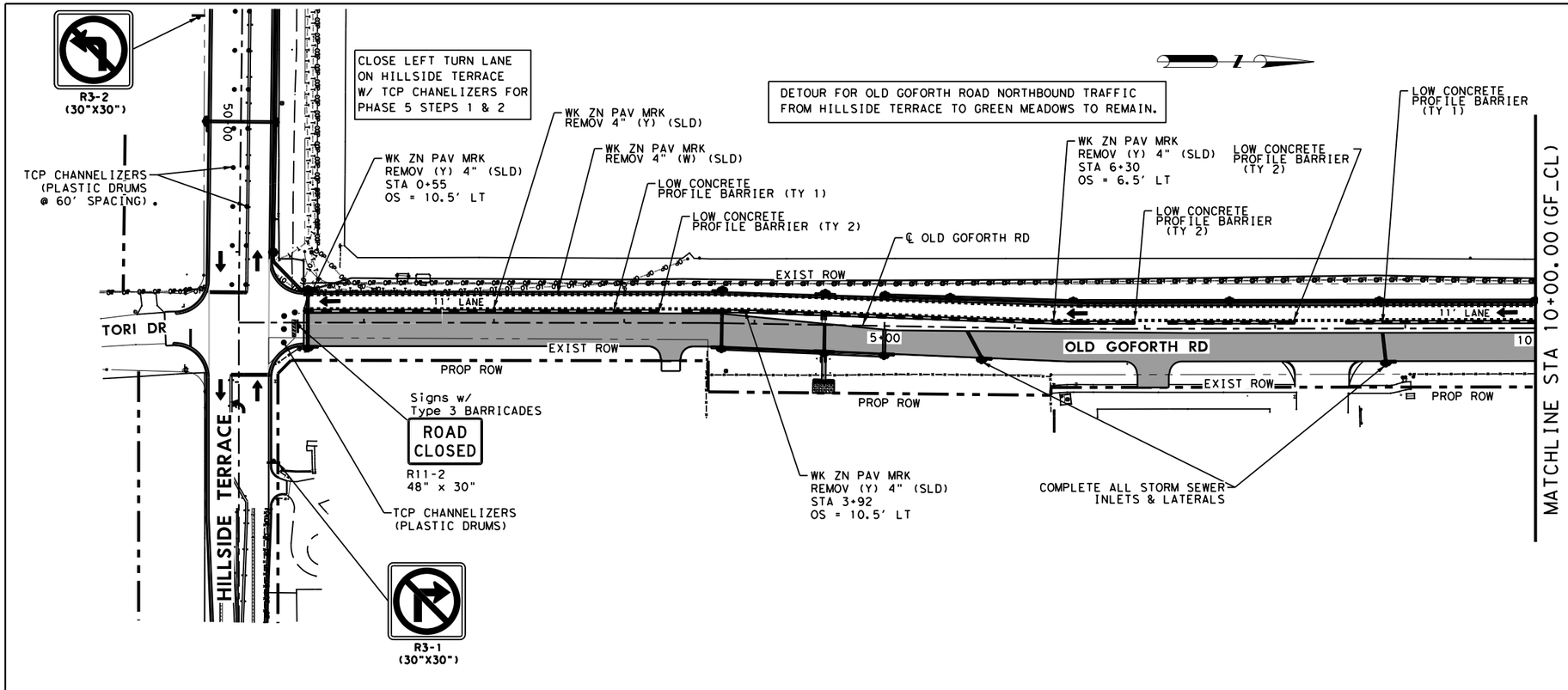
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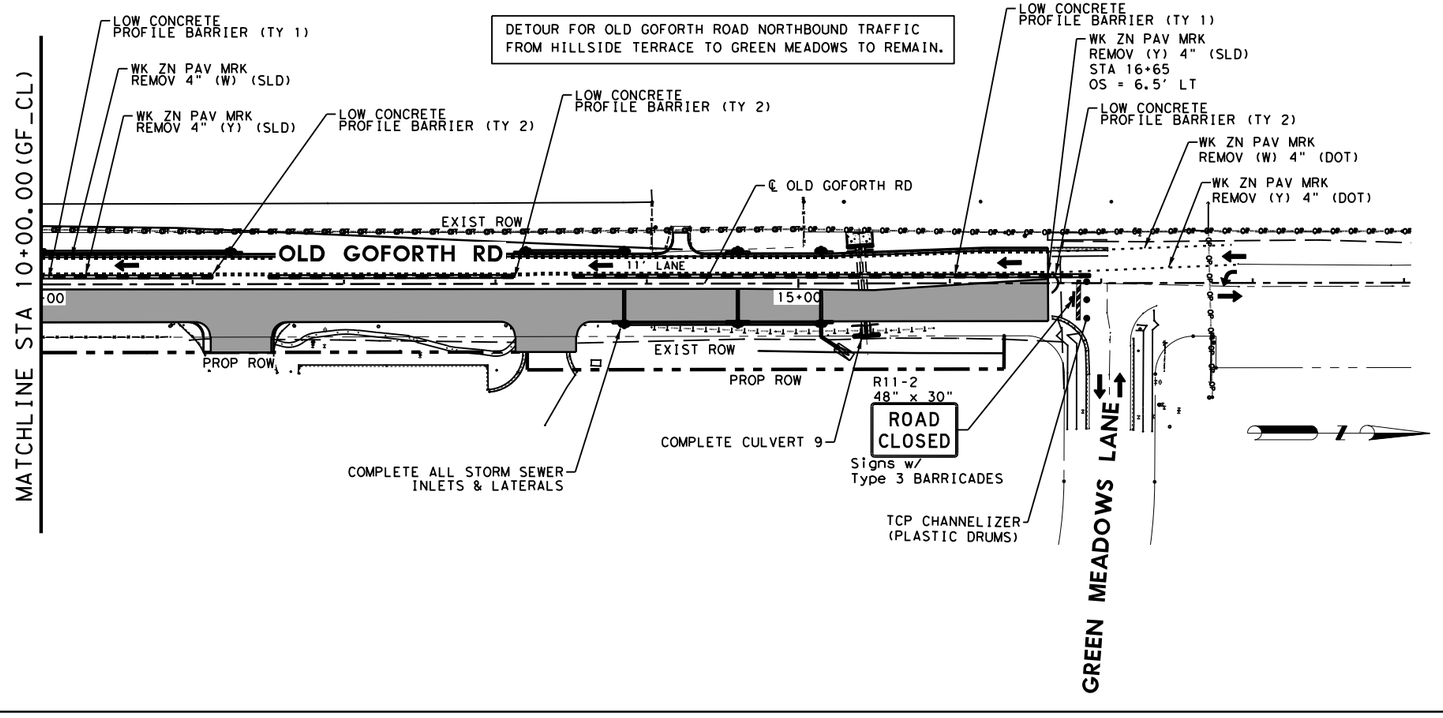
HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 5 - STEP 1

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		58
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APPROVED BY:		

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LEGEND

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5. ALL CHANNELIZING DEVICES AND SIGN PLACEMENT MUST CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD) AND TXDOT STANDARDS.
6. WARNING SIGN PLACEMENT SHALL NOT CONFLICT WITH EXISTING OR PERMANENT SIGNAGE.
7. EXISTING GROUND MOUNTED SIGNS SHALL BE TEMPORARILY REINSTALLED ON SKIDS WHERE NEEDED FOR TCP.

0 50 100
SCALE: 1"=100'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

TRAFFIC CONTROL PLAN PHASE 5 - STEP 2

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		59
CHECKED BY:		
APPROVED BY:		

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BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).

2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.

3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.

4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.

5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.

6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.

7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.

8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.

9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.

10. Where highway construction or maintenance work is being undertaken, other than mobile operations as defined by the Texas Manual on Uniform Traffic Control Devices, CSJ limit signs are required. CSJ limit signs are shown on BC(2). The OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits. For mobile operations, CSJ limit signs are not required.

11. Traffic control devices should be in place only while work is actually in progress or a definite need exists.

12. The Engineer has the final decision on the location of all traffic control devices.

13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

2. Except in emergency situations, flagger stations shall be illuminated when flagging is used at night.

COMPLIANT WORKZONE TRAFFIC CONTROL DEVICES

1. Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources.

2. Work zone traffic control devices shall be compliant with the Manual for Assessing safety Hardware (MASH).

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation

Traffic Safety Division Standard

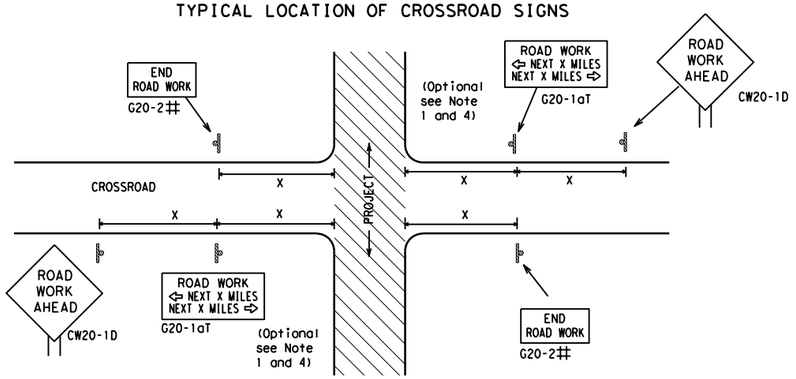
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-21

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©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
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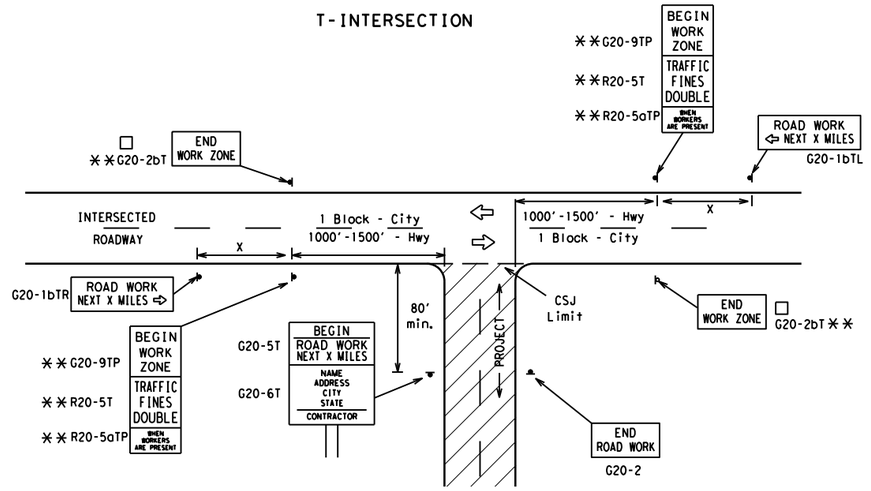
TYPICAL LOCATION OF CROSSROAD SIGNS



May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads (see Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume as per TMUTCD Part 5. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1aT)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection, the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1bTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1bTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[1,5,6]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign △ Spacing "X"
MPH	Feet (Apprx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

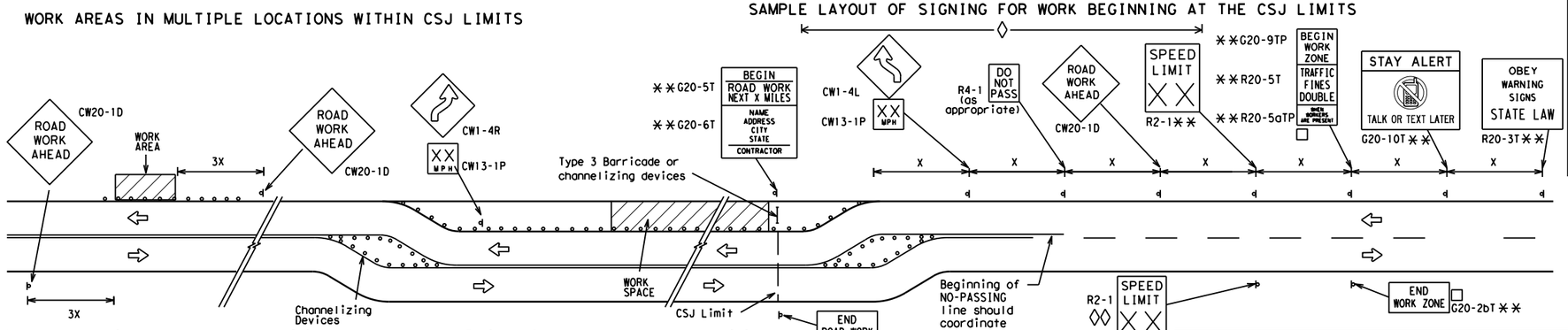
△ Minimum distance from work area to first Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer as per TMUTCD Part 5. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

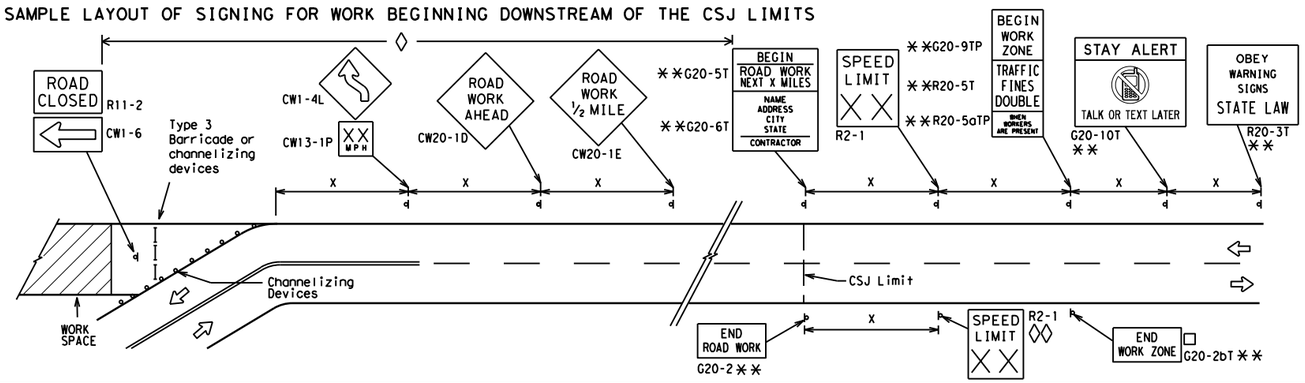
WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS



When extended distances occur between minimal work spaces, the Engineer/Inspector should ensure additional "ROAD WORK AHEAD"(CW20-1D)signs are placed in advance of these work areas to remind drivers they are still within the project limits. See the applicable TCP sheets for exact location and spacing of signs and channelizing devices.

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

□ The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ Limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ Limits where traffic fines may double if workers are present.

** CSJ limit signing is required for highway construction and maintenance work, with the exception of mobile operations.

◊ Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

◊◊ Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

⟼	Type 3 Barricade
○ ○ ○	Channelizing Devices
▬	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

SHEET 2 OF 12

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-21

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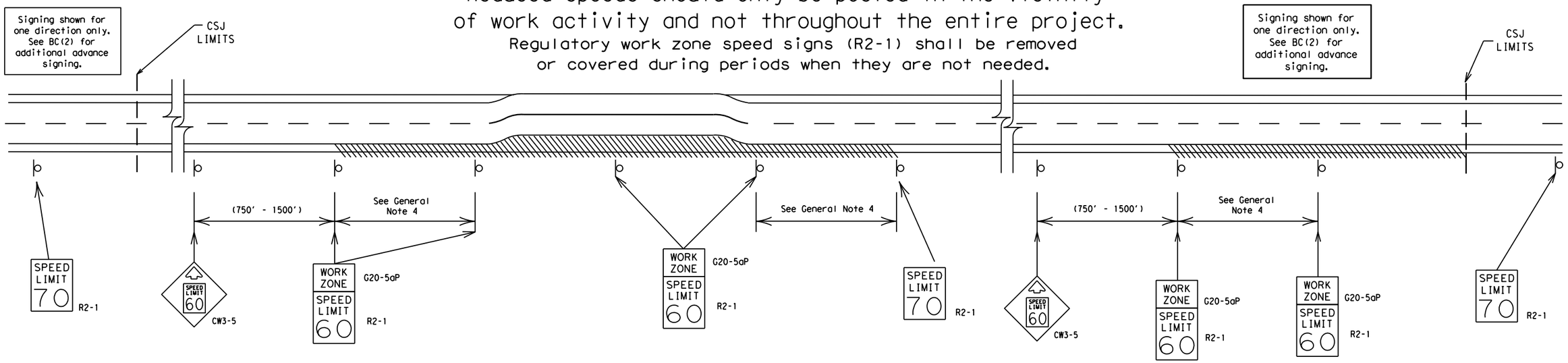
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within Incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.

Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:

a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver

As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually in the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorists only when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW3-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (drone) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

Texas Department of Transportation | Traffic Safety Division Standard

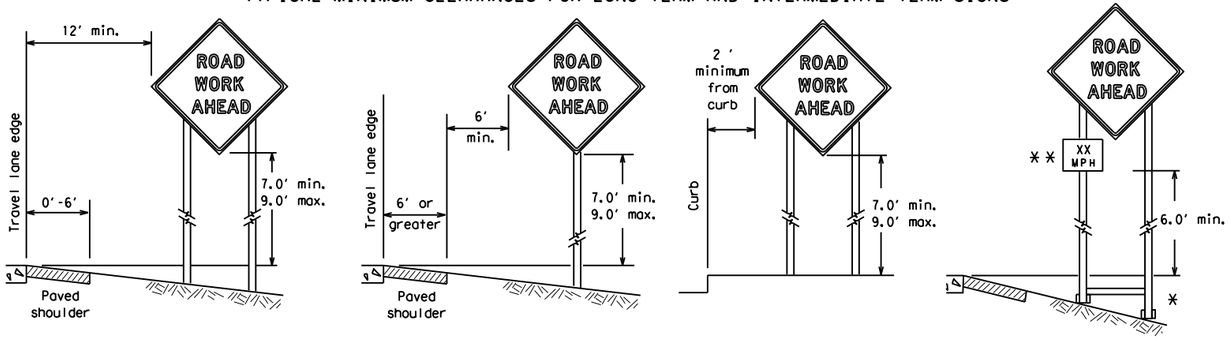
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

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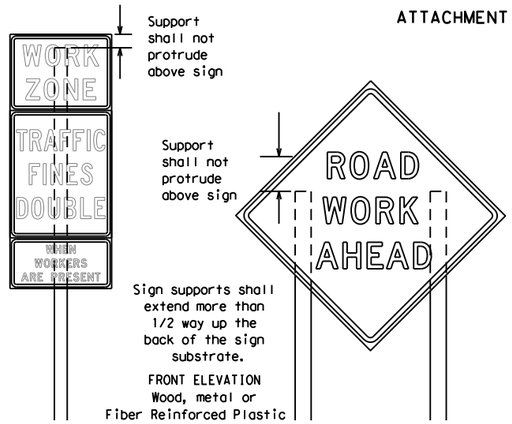
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS

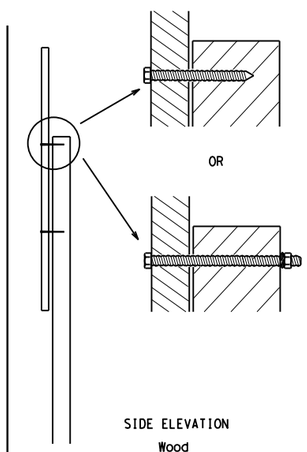


* When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

** When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS





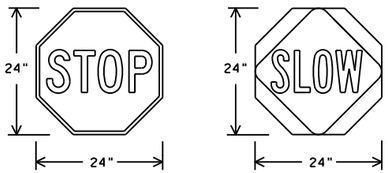
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the spice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24".
2. STOP/SLOW paddles shall be retroreflectorized when used at night.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



SHEETING REQUIREMENTS (WHEN USED AT NIGHT)		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	ORANGE	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDER	WHITE	TYPE B OR C SHEETING
LEGEND & BORDER	BLACK	ACRYLIC NON-REFLECTIVE FILM

CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, specific service (LOGO), or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition. For details for covering large guide signs see the TS-CD standard.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
4. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
5. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC standard sheets, TLRS standard sheets or the CWZTCD list. The signs shall meet the required mounting heights shown on the BC, or the SMD standard sheets during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
6. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD) for small roadside signs. Supports for temporary large roadside signs shall meet the requirements detailed on the Temporary Large Roadside Signs (TLRS) standard sheets. The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
6. Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used, the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

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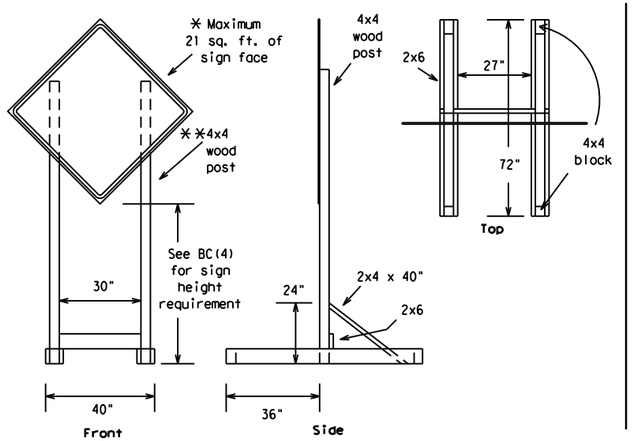
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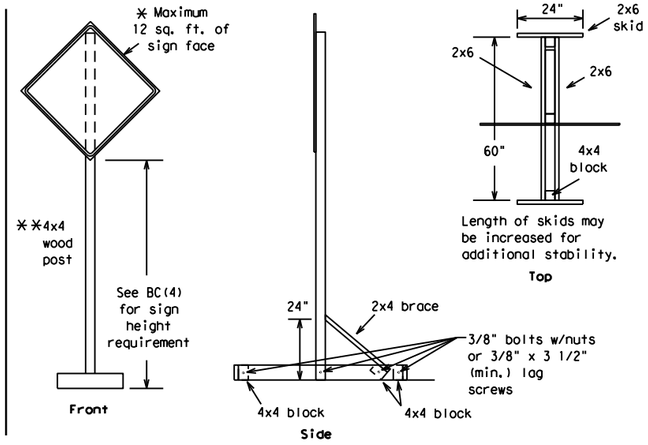
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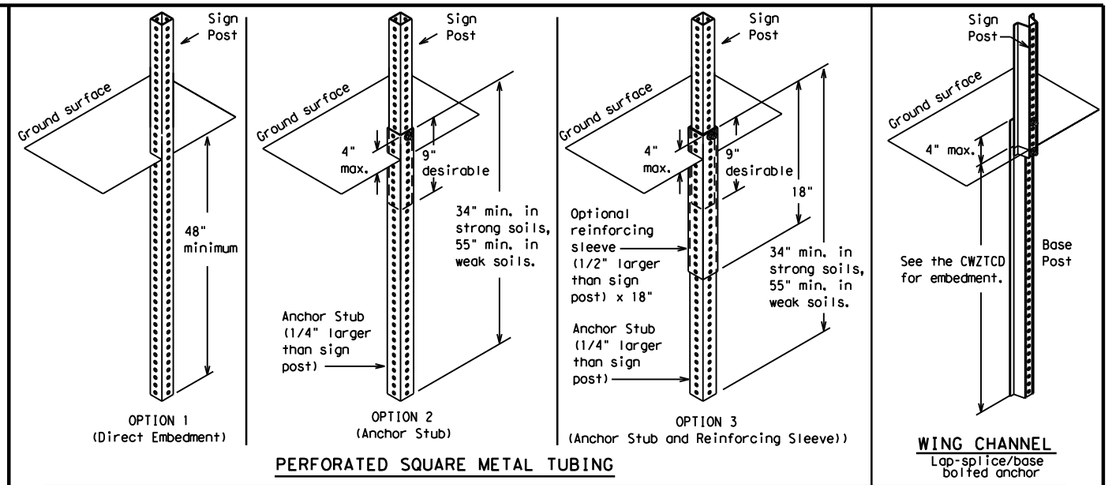
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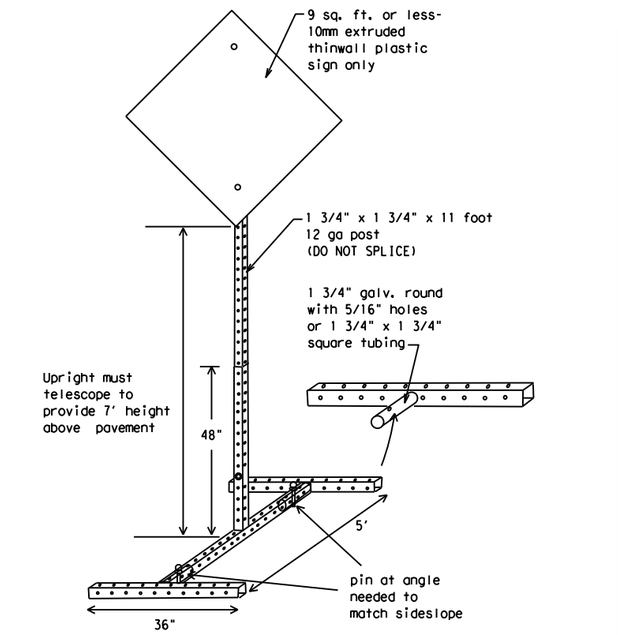
SKID MOUNTED WOOD SIGN SUPPORTS

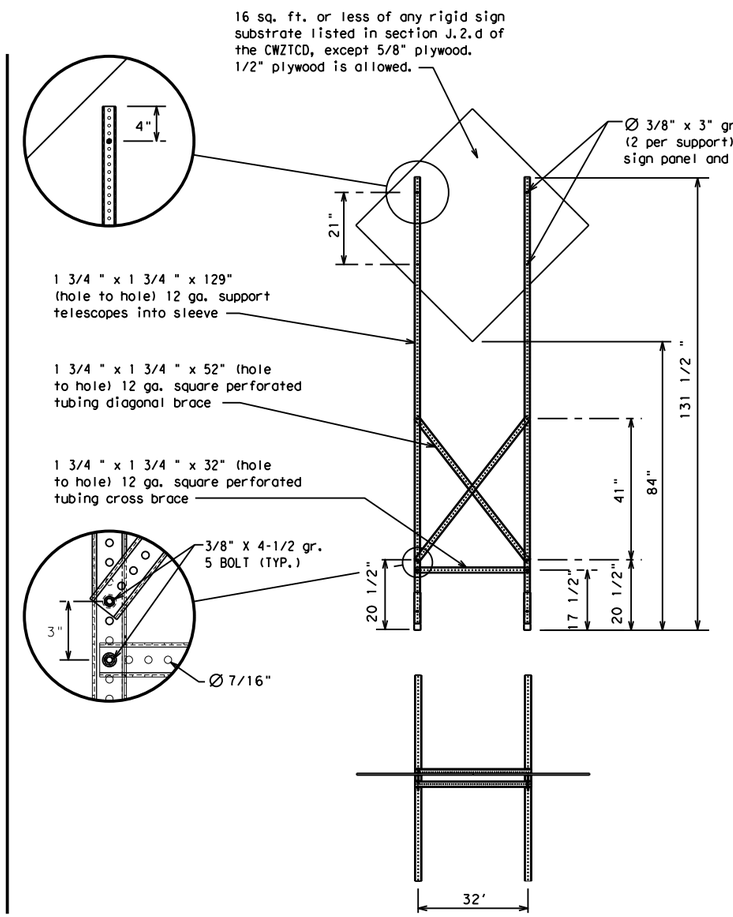
* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

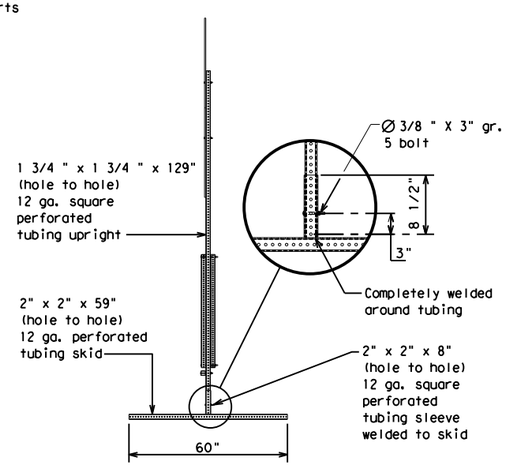


GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.







SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS

* LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

* See BC(4) for definition of "Work Duration."

** Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.

□ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

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BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use, the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT
Major	MAJ
Miles	MI
Miles Per Hour	MPH
Minor	MNR
Monday	MON
Normal	NORM
North	N
Northbound	(route) N
Parking	PKING
Road	RD
Right Lane	RT LN
Saturday	SAT
Service Road	SERV RD
Shoulder	SHLDR
Slippery	SLIP
South	S
Southbound	(route) S
Speed	SPD
Street	ST
Sunday	SUN
Telephone	PHONE
Temporary	TEMP
Thursday	THURS
To Downtown	TO DWNTN
Traffic	TRAF
Travelers	TRVLRS
Tuesday	TUES
Time Minutes	TIME MIN
Upper Level	UPR LEVEL
Vehicles (s)	VEH, VEHS
Warning	WARN
Wednesday	WED
Weight Limit	WT LIMIT
West	W
Westbound	(route) W
Wet Pavement	WET PVMT
Will Not	WONT

Roadway designation * IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

- FREEWAY CLOSED X MILE
- FRONTAGE ROAD CLOSED
- ROAD CLOSED AT SH XXX
- SHOULDER CLOSED XXX FT
- ROAD CLSD AT FM XXXX
- RIGHT LN CLOSED XXX FT
- RIGHT X LANES CLOSED
- RIGHT X LANES OPEN
- CENTER LANE CLOSED
- DAYTIME LANE CLOSURES
- NIGHT LANE CLOSURES
- I-XX SOUTH EXIT CLOSED
- VARIOUS LANES CLOSED
- EXIT XXX CLOSED X MILE
- EXIT CLOSED
- RIGHT LN TO BE CLOSED
- MALL DRIVEWAY CLOSED
- X LANES CLOSED TUE - FRI
- XXXXXXXX BLVD CLOSED

Other Condition List

- ROADWORK XXX FT
- ROAD REPAIRS XXXX FT
- FLAGGER XXXX FT
- LANE NARROWS XXXX FT
- RIGHT LN NARROWS XXXX FT
- TWO-WAY TRAFFIC XX MILE
- MERGING TRAFFIC XXXX FT
- CONST TRAFFIC XXX FT
- LOOSE GRAVEL XXXX FT
- UNEVEN LANES XXXX FT
- DETOUR X MILE
- ROUGH ROAD XXXX FT
- ROADWORK PAST SH XXXX
- ROADWORK NEXT FRI-SUN
- BUMP XXXX FT
- US XXX EXIT X MILES
- TRAFFIC SIGNAL XXXX FT
- LANES SHIFT *

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

- MERGE RIGHT
- FORM X LINES RIGHT
- DETOUR NEXT X EXITS
- USE XXXXX RD EXIT
- USE EXIT XXX
- USE EXIT I-XX NORTH
- STAY ON US XXX SOUTH
- USE I-XX E TO I-XX N
- TRUCKS USE US XXX N
- WATCH FOR TRUCKS
- WATCH FOR TRUCKS
- EXPECT DELAYS
- EXPECT DELAYS
- PREPARE TO STOP
- REDUCE SPEED XXX FT
- END SHOULDER USE
- USE OTHER ROUTES
- WATCH FOR WORKERS
- STAY IN LANE *

Location List

- AT FM XXXX
- BEFORE RAILROAD CROSSING
- NEXT X MILES
- PAST US XXX EXIT
- XXXXXXX TO XXXXXXX
- US XXX TO FM XXXX

Warning List

- SPEED LIMIT XX MPH
- MAXIMUM SPEED XX MPH
- MINIMUM SPEED XX MPH
- ADVISORY SPEED XX MPH
- RIGHT LANE EXIT
- USE CAUTION
- DRIVE SAFELY
- DRIVE WITH CARE

** Advance Notice List

- TUE-FRI XX AM- X PM
- APR XX-XX X PM-X AM
- BEGINS MONDAY
- BEGINS MAY XX
- MAY X-X XX PM - XX AM
- NEXT FRI-SUN
- XX AM TO XX PM
- NEXT TUE AUG XX
- TONIGHT XX PM- XX AM

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

Texas Department of Transportation

Traffic Safety Division Standard

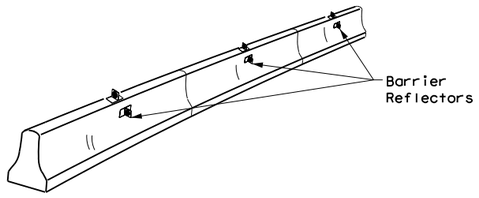
BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

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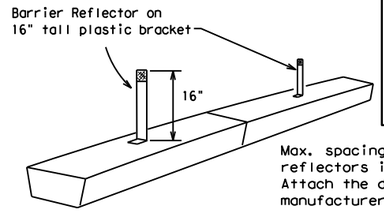
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1. Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.



CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.

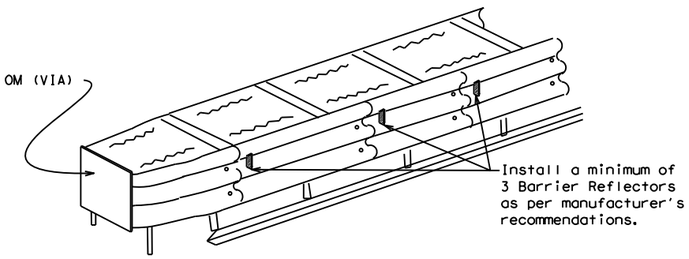


Max. spacing of barrier reflectors is 20 feet. Attach the delineators as per manufacturer's recommendations.

LOW PROFILE CONCRETE BARRIER (LPCB)

LOW PROFILE CONCRETE BARRIER (LPCB) USED IN WORK ZONES

LPCB is approved for use in work zone locations, where the posted speed is 45mph, or less. See Roadway Standard Sheet LPCB.

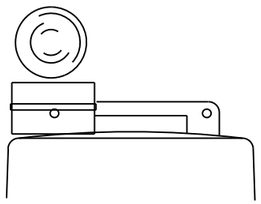


DELINEATION OF END TREATMENTS

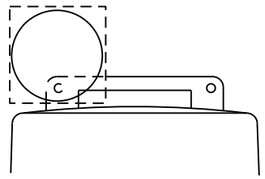
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet the apppropriate crashworthy standards as defined in the Manual for Assessing Safety Hardware (MASH). Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square.Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

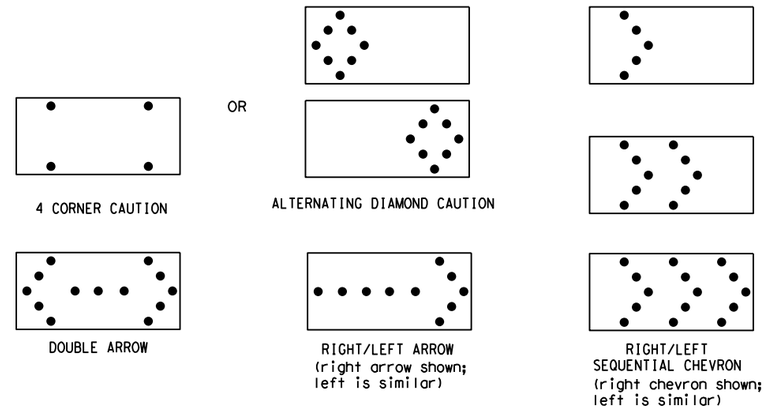
1. Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
8. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
9. The sequential arrow display is NOT ALLOWED.
10. The flashing arrow display is the TxDOT standard; however, the sequential chevron display may be used during daylight operations.
11. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
12. A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
13. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
14. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CWZTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-21

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GENERAL NOTES

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections, one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

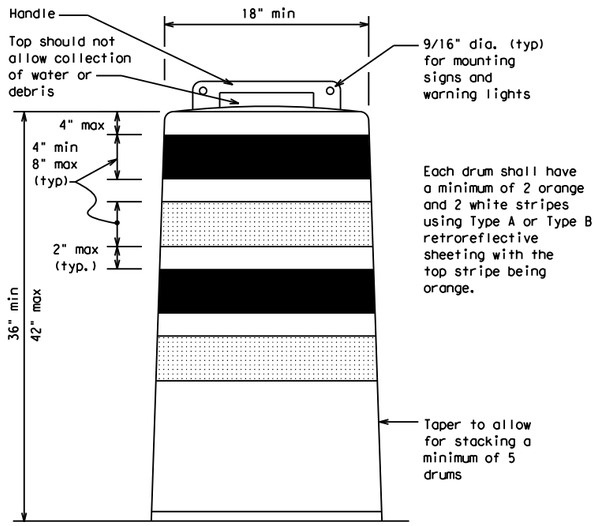
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

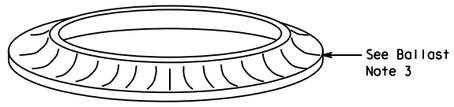
RETROREFLECTIVE SHEETING

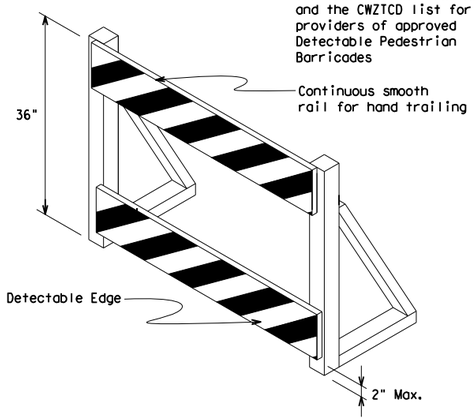
1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A or Type B reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

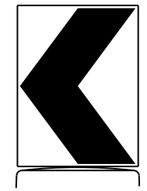




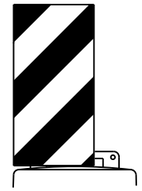


DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. Refer to WZ(BTS-2) for Pedestrian Control requirements for Sidewalk Diversions, Sidewalk Detours and Crosswalk Closures.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a Detectable Pedestrian Barricade shall be placed across the full width of the closed sidewalk instead of a Type 3 Barricade.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades should use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



18" x 24" Sign
(Maximum Sign Dimension)
Chevron CW1-8, Opposing Traffic Lane Divider, Driveway sign D70a, Keep Right R4 series or other signs as approved by Engineer



12" x 24"
Vertical Panel
mount with diagonals sloping down towards travel way

Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A or Type B. Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations, they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

Texas Department of Transportation | Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

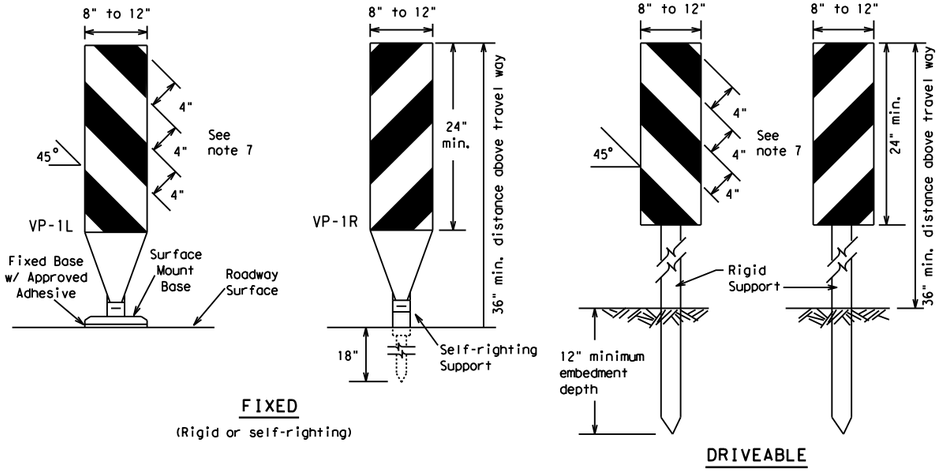
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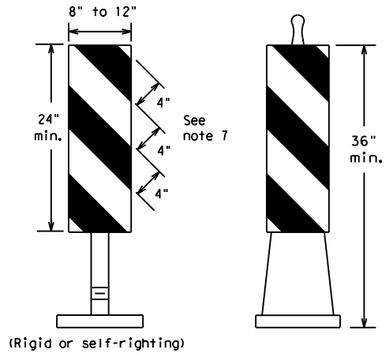
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FIXED

(Rigid or self-righting)

DRIVEABLE

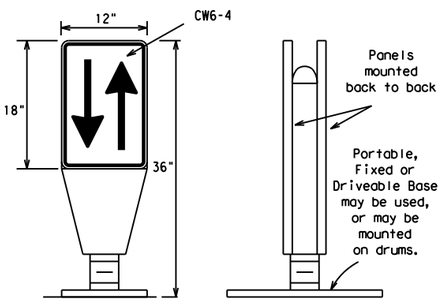


(Rigid or self-righting)

PORTABLE

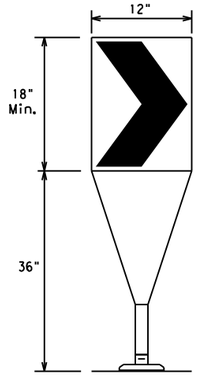
1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual for additional requirements on the use VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



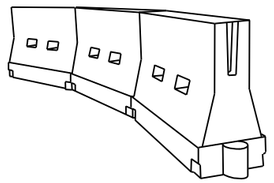
Fixed Base w/ Approved Adhesive (Driveable Base, or Flexible Support can be used)

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways, self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10). Place reflective sheeting near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate Manual for Assessing Safety Hardware (MASH) crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L=WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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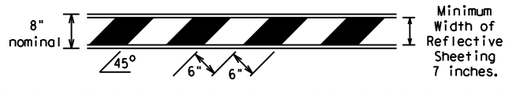
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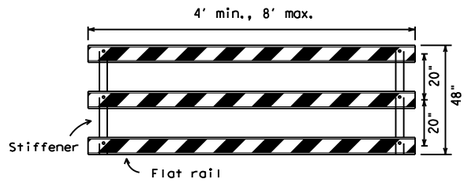
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road, striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A or Type B conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



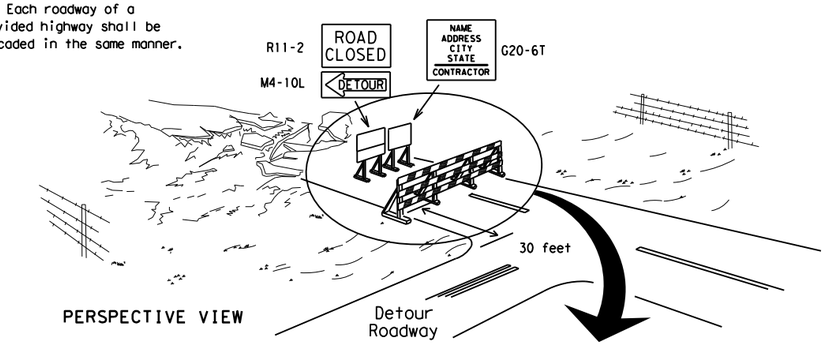
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

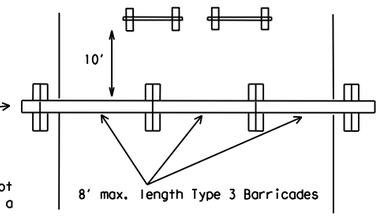
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

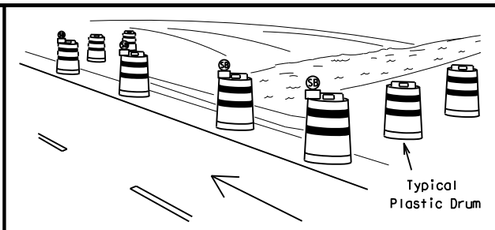
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

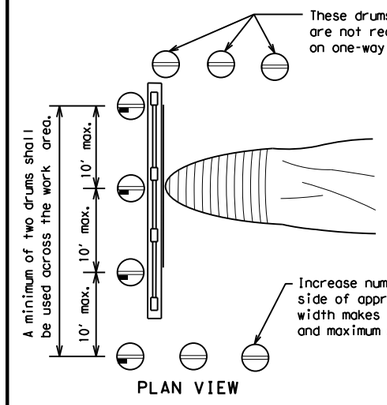
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

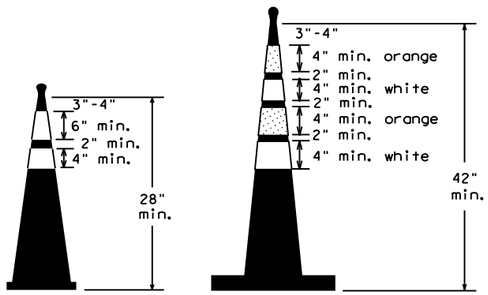
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



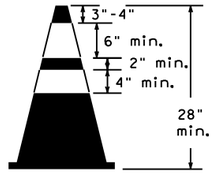
LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

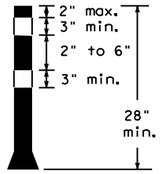
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



Two-Piece cones



One-Piece cones

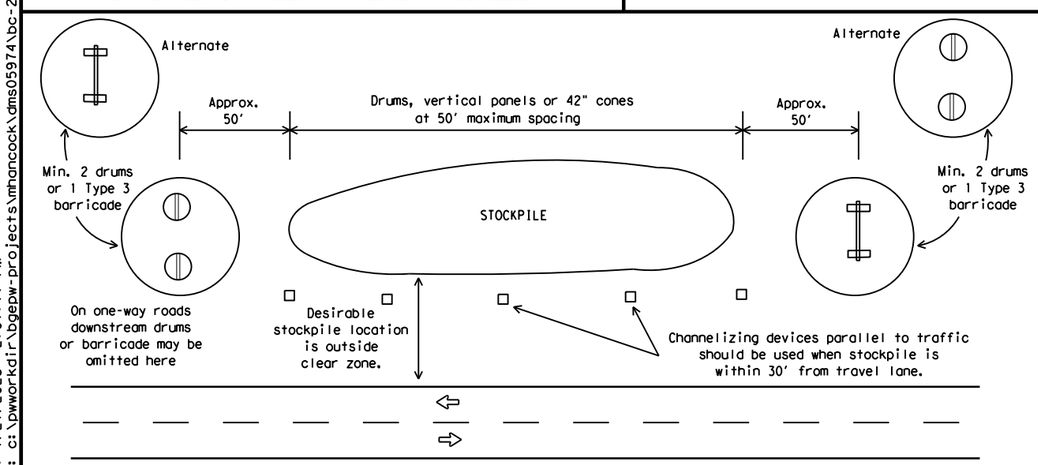


Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A or Type B.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Texas Department of Transportation — Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-21

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9-07 8-14	DIST	COUNTY		SHEET NO.
7-13 5-21	AUS	HAYS		69

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

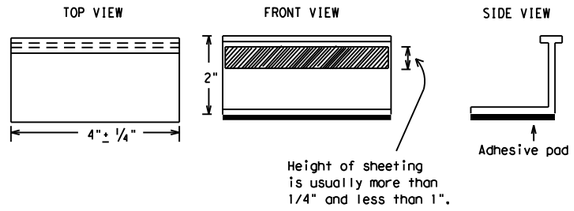
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

BC(11)-21

FILE: bc-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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1-02 7-13	DIST	COUNTY		SHEET NO.
11-02 8-14	AUS	HAYS		70

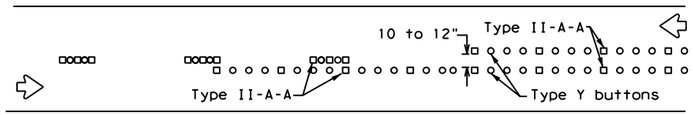
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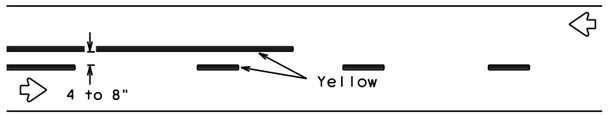
PAVEMENT MARKING PATTERNS



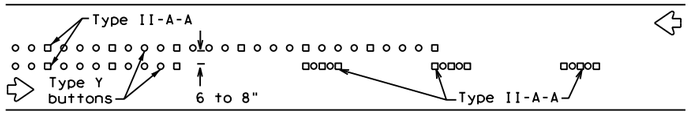
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



RAISED PAVEMENT MARKERS - PATTERN A



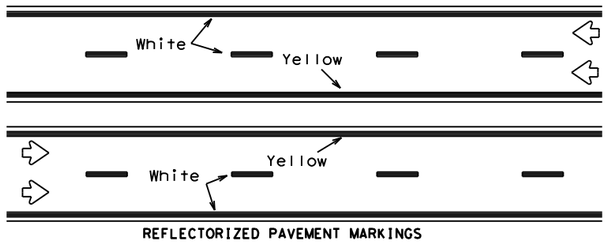
REFLECTORIZED PAVEMENT MARKINGS - PATTERN B



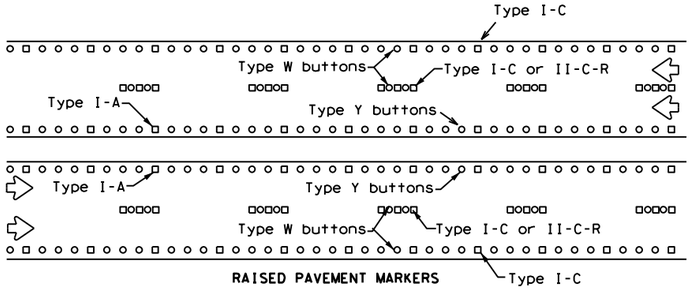
RAISED PAVEMENT MARKERS - PATTERN B

Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



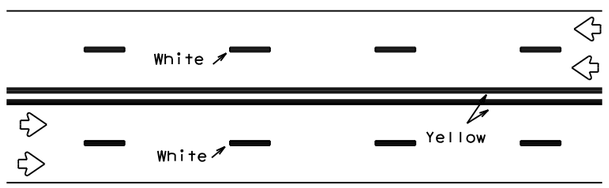
REFLECTORIZED PAVEMENT MARKINGS



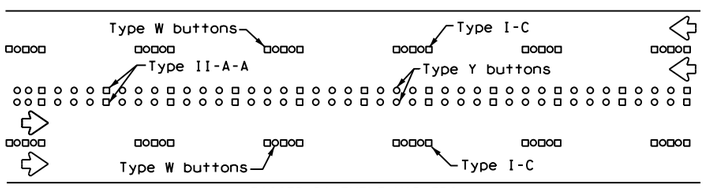
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



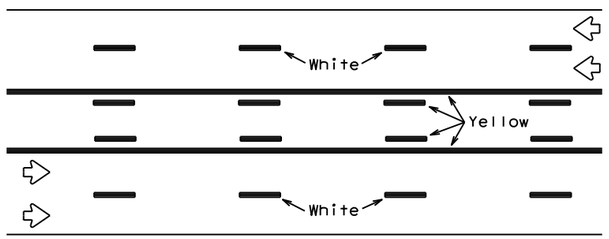
REFLECTORIZED PAVEMENT MARKINGS



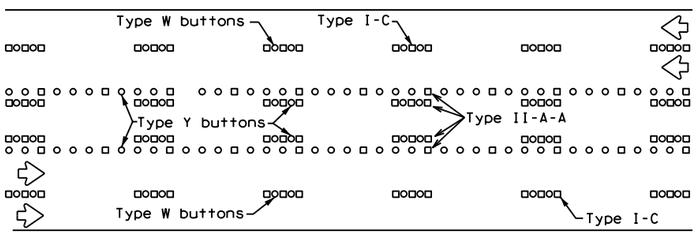
RAISED PAVEMENT MARKERS

Prefabricated markings may be substituted for reflectorized pavement markings.

LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS



RAISED PAVEMENT MARKERS

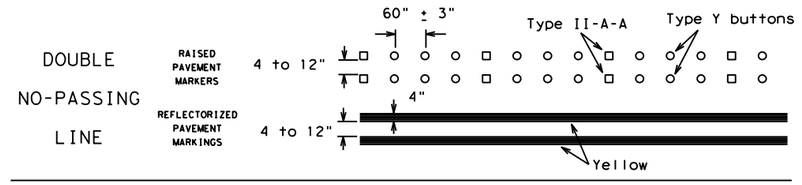
Prefabricated markings may be substituted for reflectorized pavement markings.

TWO-WAY LEFT TURN LANE

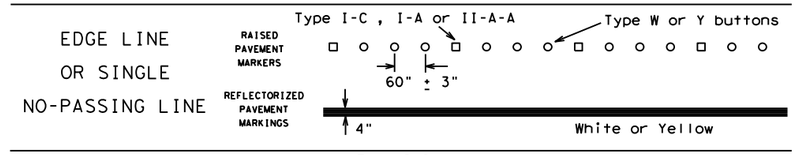
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS

SOLID LINES

DOUBLE NO-PASSING LINE

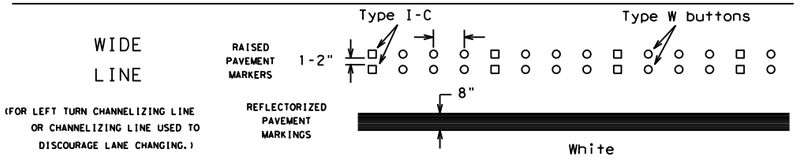


EDGE LINE OR SINGLE NO-PASSING LINE



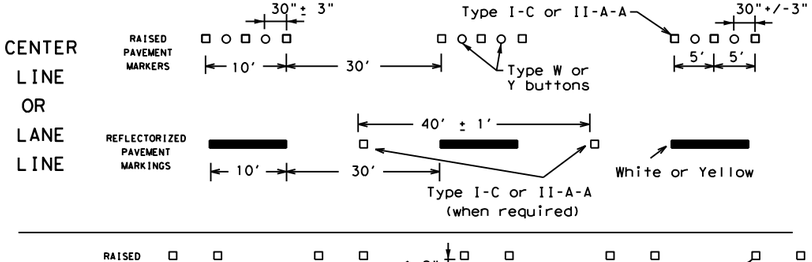
WIDE LINE

(FOR LEFT TURN CHANNELIZING LINE OR CHANNELIZING LINE USED TO DISCOURAGE LANE CHANGING.)

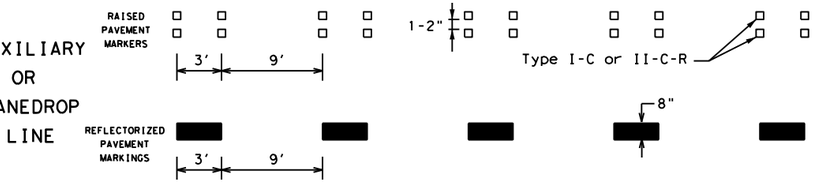


BROKEN LINES

CENTER LINE OR LANE LINE

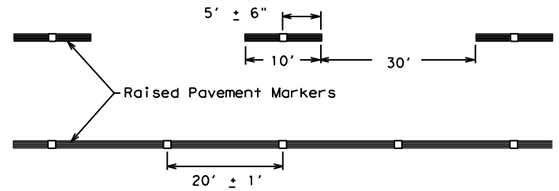


AUXILIARY OR LANEDROP LINE



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Centerline only - not to be used on edge lines

Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

Texas Department of Transportation

Traffic Safety Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-21

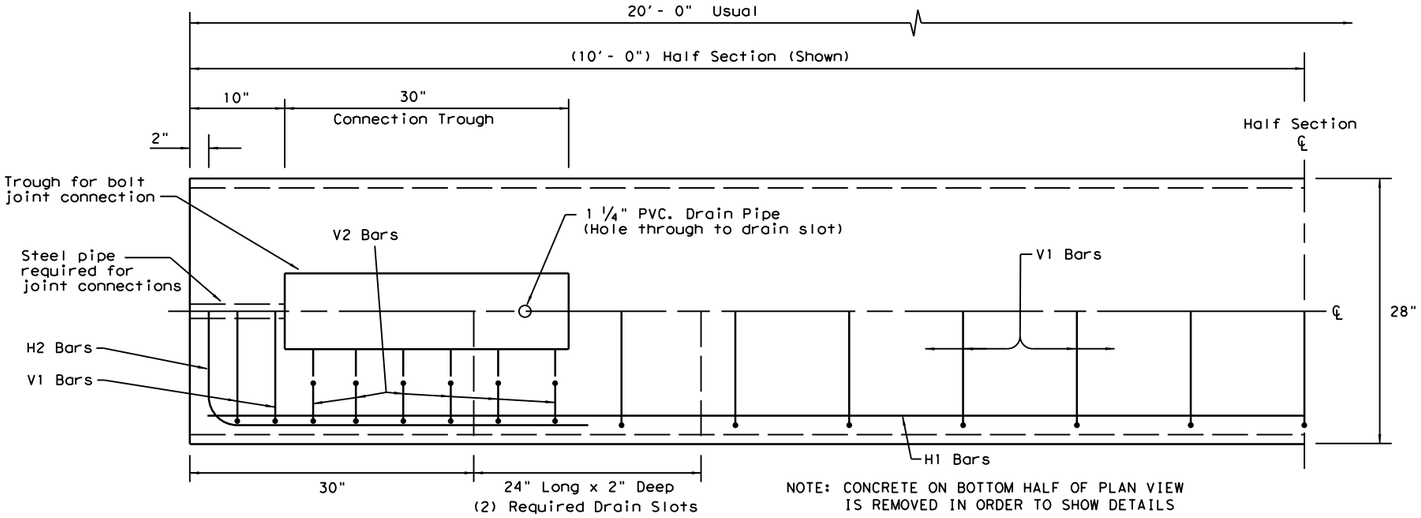
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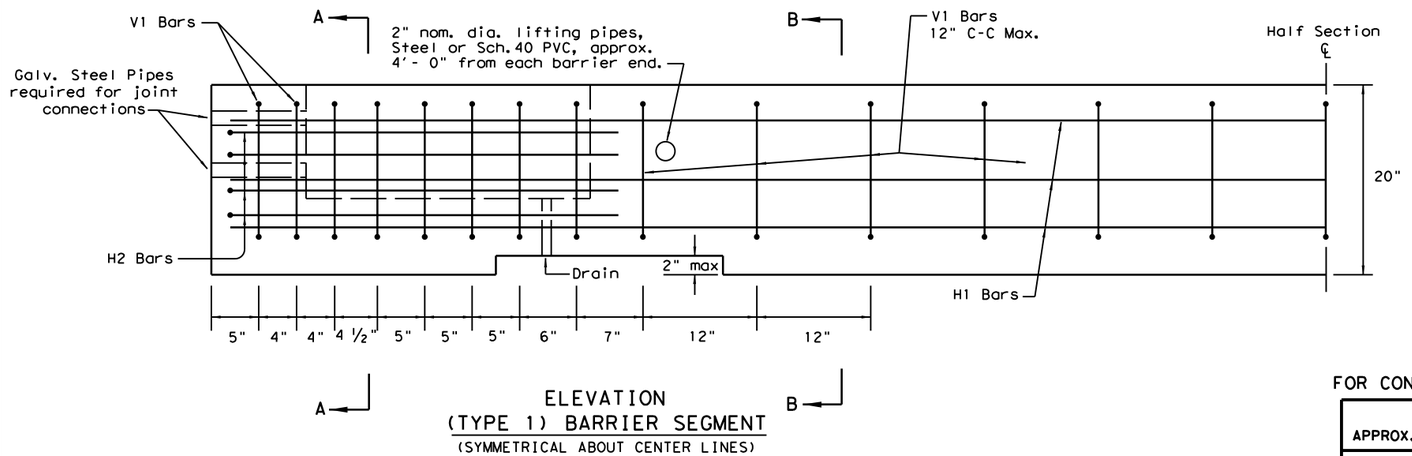
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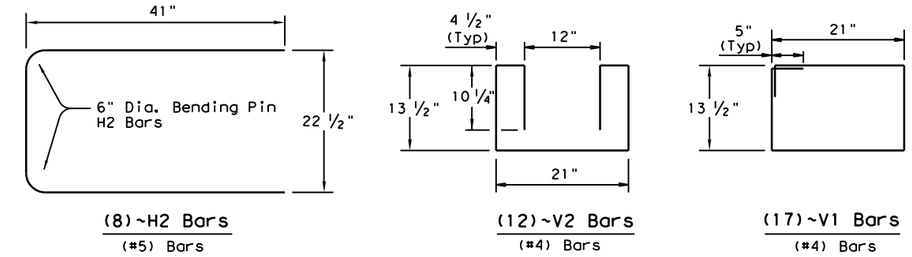
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PLAN
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



ELEVATION
(TYPE 1) BARRIER SEGMENT
(SYMMETRICAL ABOUT CENTER LINES)



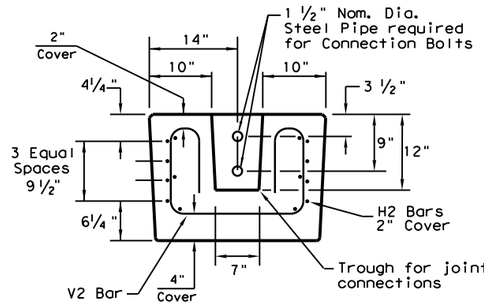
(8)~H2 Bars
(#5) Bars

(12)~V2 Bars
(#4) Bars

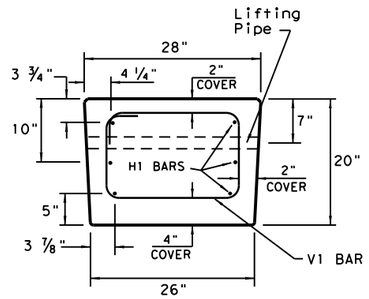
(17)~V1 Bars
(#4) Bars

REINFORCING STEEL DETAILS
TYPE 1 - BARRIER SEGMENT

Note: Use 2" Dia. Bending Pin, unless otherwise shown



SECTION A-A



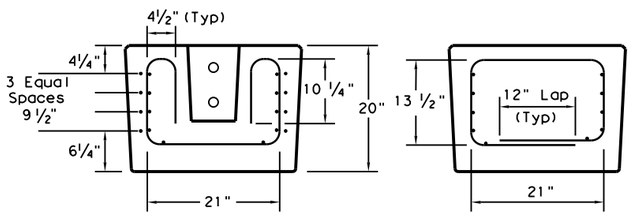
SECTION B-B

GENERAL NOTES

1. Low Profile Concrete Barrier (LPCB), is approved for use in temporary work zone locations, where the posted speed is 45 mph, or less.
2. Concrete shall be Class H for precast barrier with a minimum compressive strength of 3,600 psi.
3. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
4. Precast LPCB barrier length shall be 20 ft.
5. All barrier edges shall have ¾" chamfer or a tooled radius.
6. Joint connection hardware shall be in accordance with Item 449, "Anchor Bolts." and is considered subsidiary.
7. Steel pipe required for joint connection bolts shall be galvanized in accordance with Item 445, "Galvanizing."
8. Welded wire reinforcement (WWR) may be used in lieu of conventional reinforcement for Type 1 barrier, and shall meet the requirements shown.

FOR CONTRACTORS INFORMATION ONLY

(TYPE 1) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	2.6
REINFORCING STEEL	LBS	330
TOTAL BARRIER WT.	LBS	11000



SECTION A-A

SECTION B-B

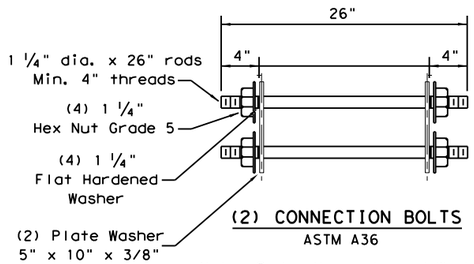
(WWR) GENERAL NOTES

1. Deformed Welded Wire Reinforcement shall conform to ASTM A497.
2. Welded wire cage may be cut or bent, if necessary, but must be approved by the Engineer.
3. Combinations of reinforcing steel and WWR are permitted, as directed by the Engineer. The dimensions from the end of the barrier section to the first wire shall not exceed 3".

REQUIRED (WWR) WIRE DESIGN

8 ~ (D31) Horizontal Wires (Equally spaced)
10 ~ (D20) Horizontal Wires (Equally spaced)
29 ~ (D20) Vertical Wires (Spaced as shown in Elevation View)

WELDED WIRE REINFORCEMENT (WWR)- OPTIONAL REINFORCING



(2) CONNECTION BOLTS
ASTM A36

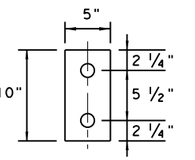


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.

SHEET 1 OF 2

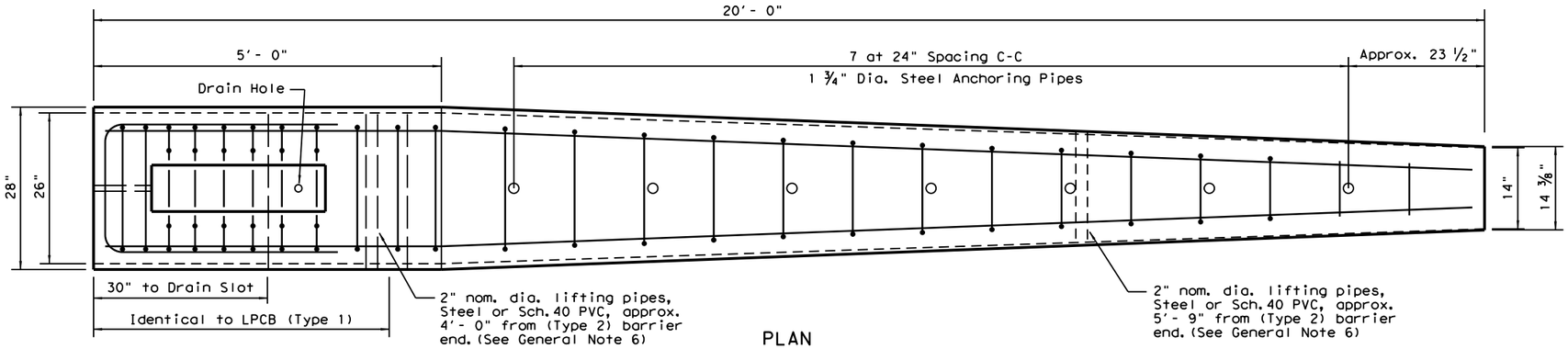
Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 1)
LPCB-13

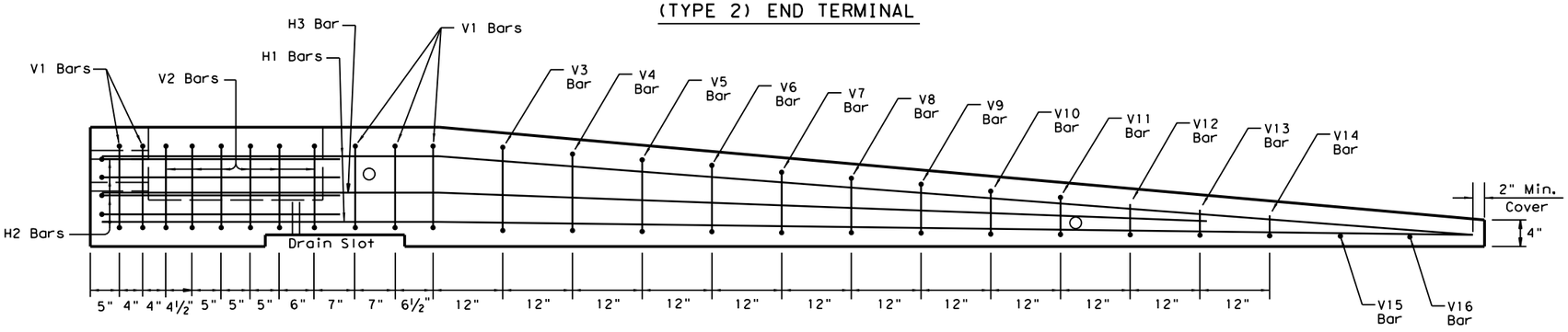
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©TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		72

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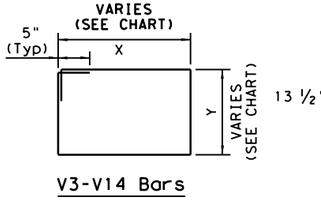


PLAN
(TYPE 2) END TERMINAL



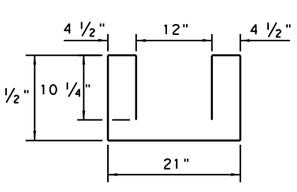
ELEVATION
(TYPE 2) END TERMINAL

Note:
Anchoring pipes not shown in Elevation View

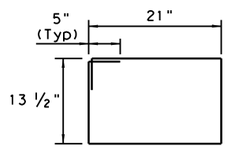


V3-V14 Bars

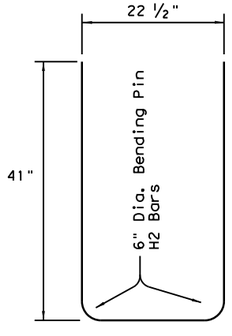
BAR (#4)	X (IN.)	Y (IN.)
V3 BAR	20 ¼	14 ½
V4 BAR	19 ½	13 ½
V5 BAR	18 ½	12 ¼
V6 BAR	17 ½	11 ¼
V7 BAR	17	10 ¼
V8 BAR	16 ¼	9
V9 BAR	15 ½	8
V10 BAR	14 ½	7
V11 BAR	13 ¾	6



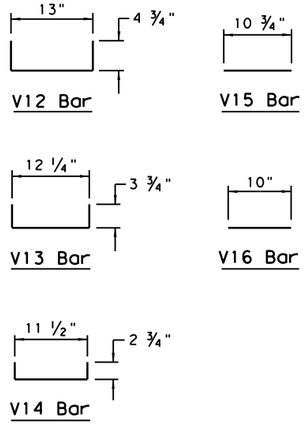
(6)~V2 Bars



(5)~V1 Bars

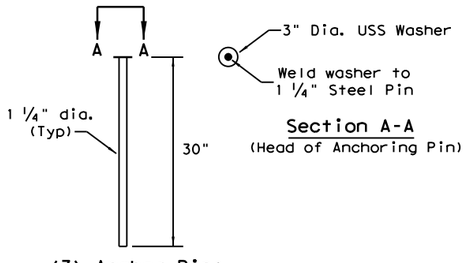


(4)~H2 Bars
(#5) Bars



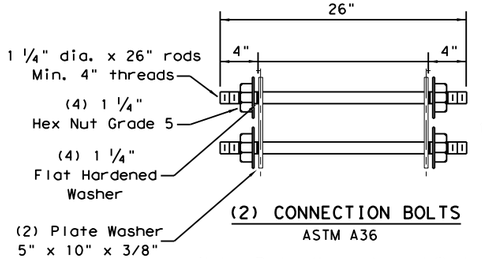
Note: All V Bars are (#4)

REINFORCING STEEL DETAILS
TYPE 2 - END TERMINAL



(7) Anchor Pins
ASTM A36 Steel (See Note 3)

Section A-A
(Head of Anchoring Pin)



(2) CONNECTION BOLTS
ASTM A36

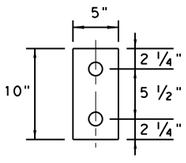
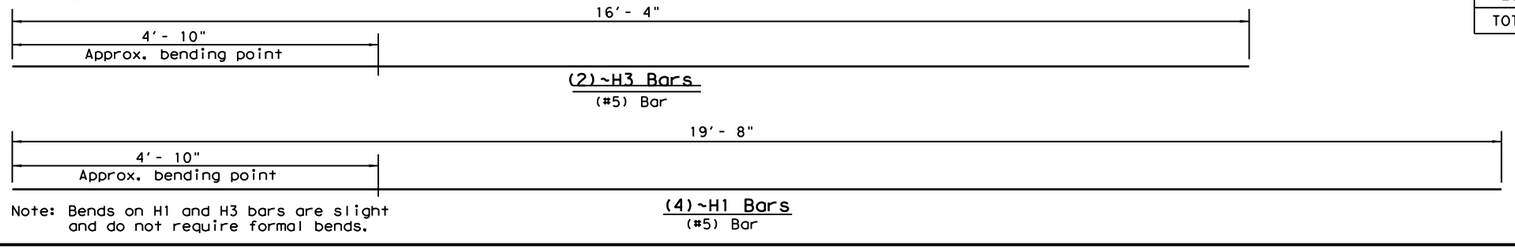


PLATE WASHER
5" x 10" x ⅜"

Note: Rods, Hex nuts and Washers shall be Galvanized.



FOR CONTRACTORS INFORMATION ONLY

(TYPE 2) APPROX. QUANTITIES 20 FT. SECTION		
CONCRETE	CY	1.65
REINFORCING STEEL	LBS	240
TOTAL BARRIER WT.	LBS	7000

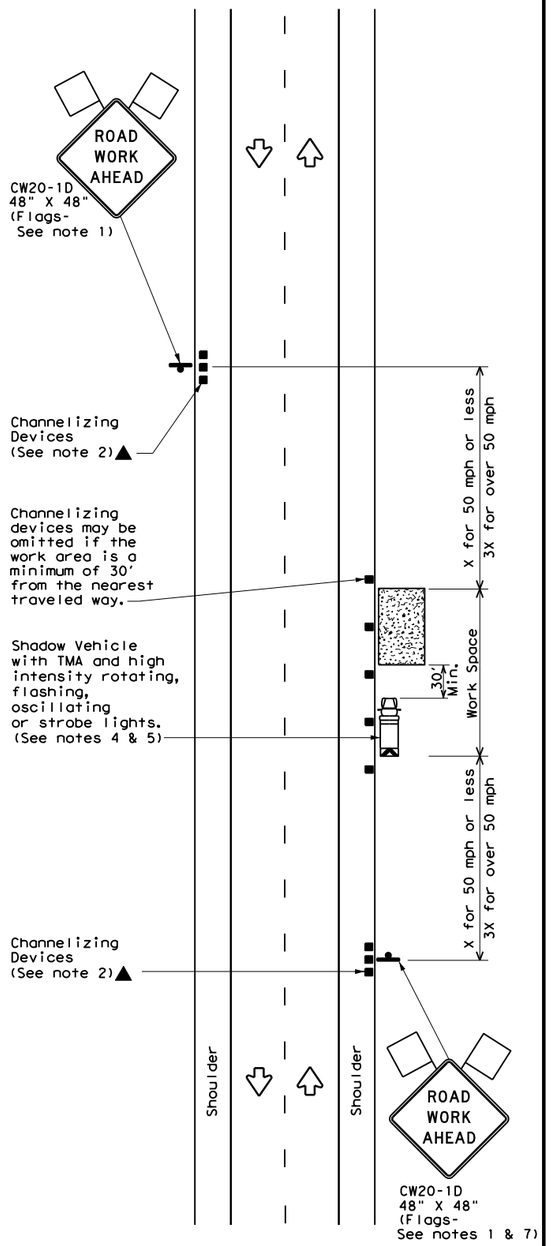
Texas Department of Transportation
Design Division Standard

LOW PROFILE CONCRETE BARRIER
PRECAST BARRIER (TYPE 2)
LPCB-13

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© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
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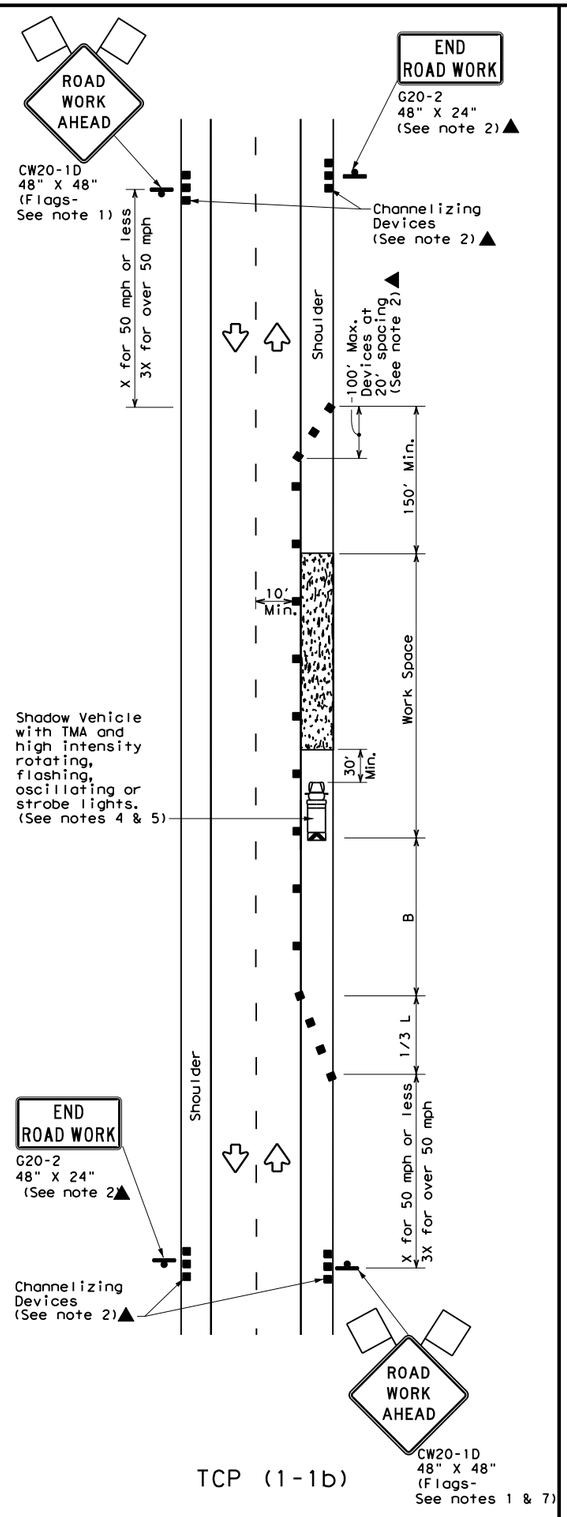
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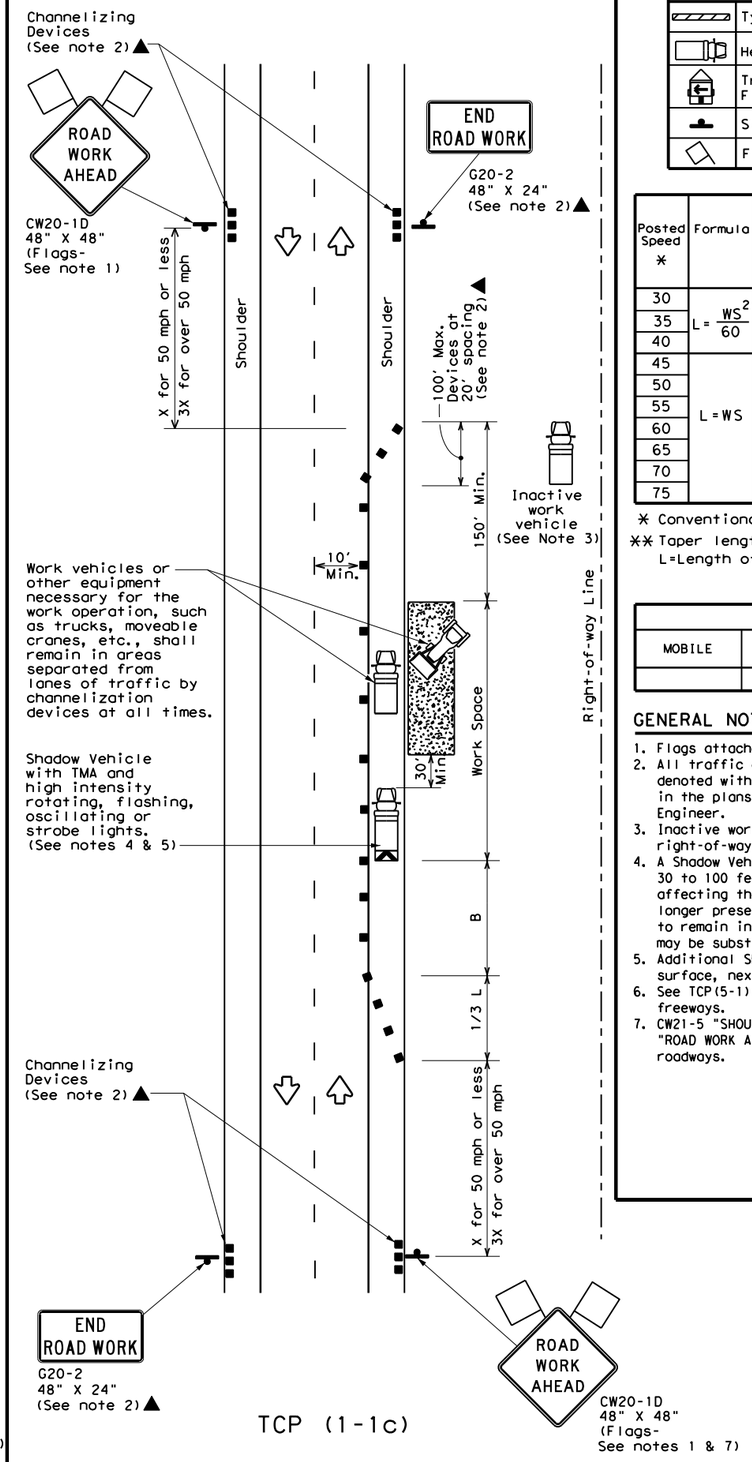
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

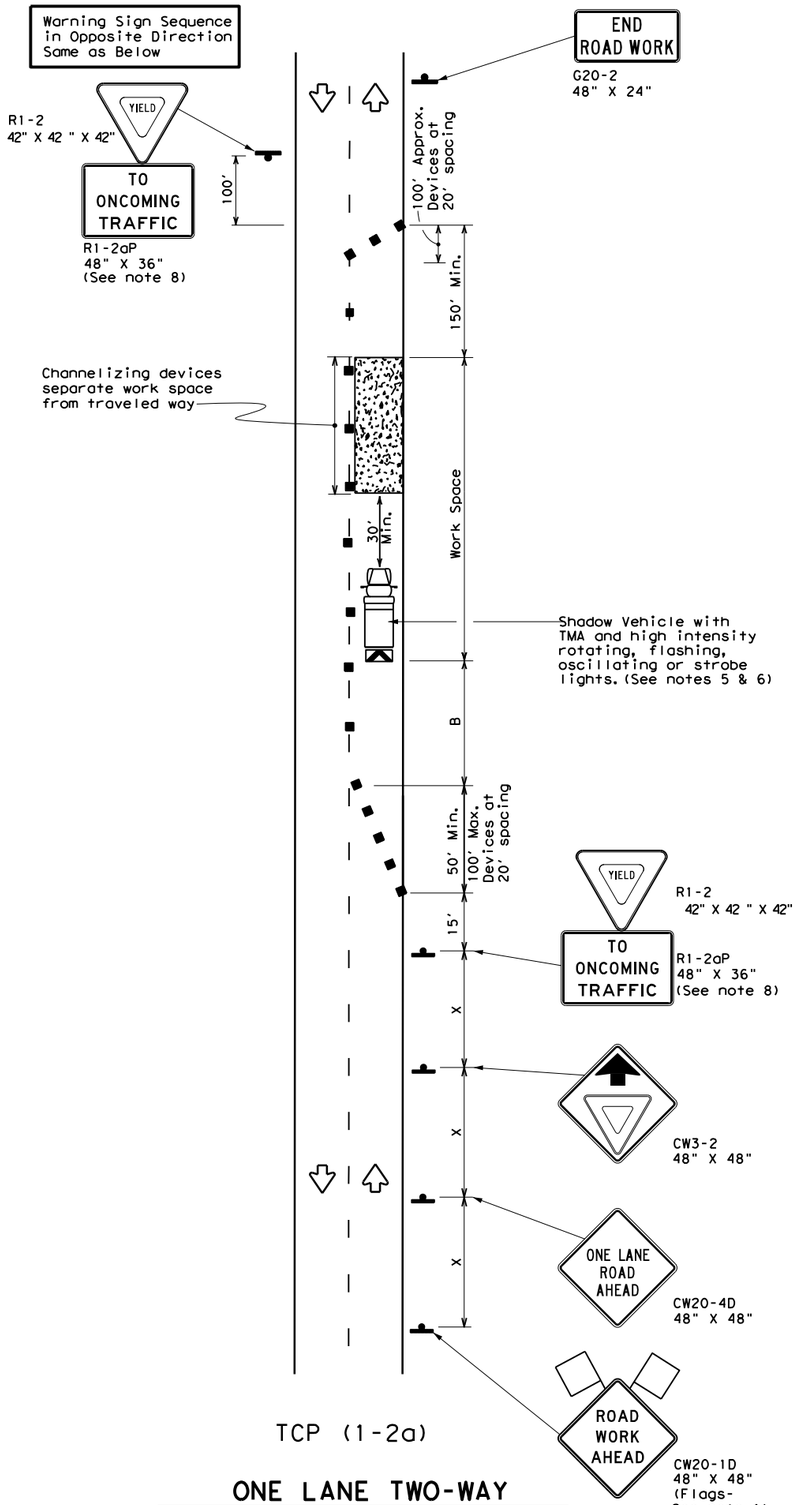
TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
©TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS 2-94 4-98 8-95 2-12 1-97 2-18				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		74

151

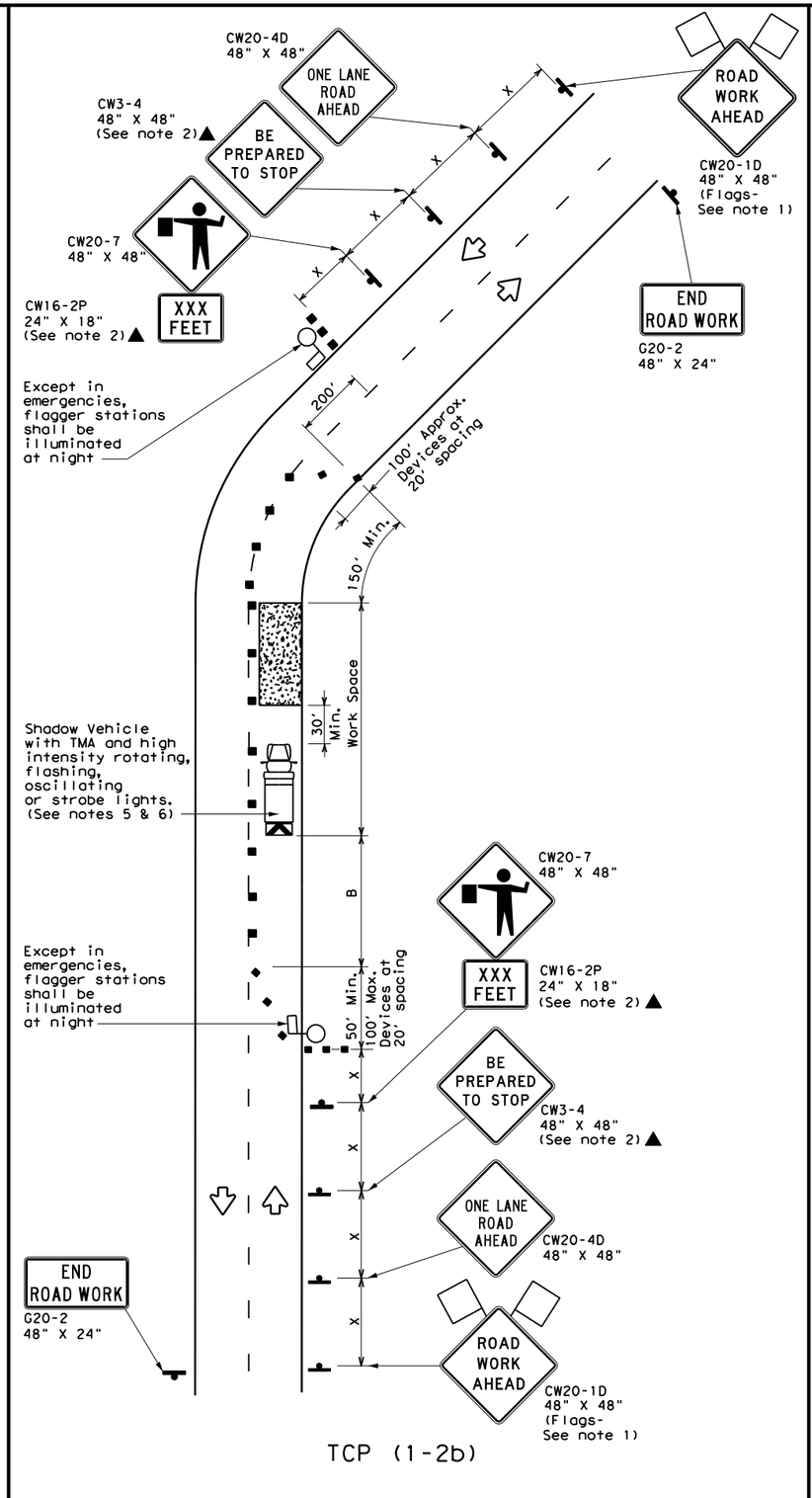
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TCP (1-2a)

ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See note 7)



TCP (1-2b)

ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L = WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4D "ONE LANE ROAD AHEAD" sign, but proper sign spacing shall be maintained.
4. Sign spacing may be increased or an additional CW20-1D "ROAD WORK AHEAD" sign may be used if advance warning ahead of the flagger or R1-2 "YIELD" sign is less than 1500 feet.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-2a)

7. R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work spaces should be no longer than one half city block. In rural areas on roadways with less than 2000 ADT, work spaces should be no longer than 400 feet.
8. R1-2 "YIELD" sign with R1-2aP "TO ONCOMING TRAFFIC" plaque shall be placed on a support at a 7 foot minimum mounting height.

TCP (1-2b)

9. Flaggers should use two-way radios or other methods of communication to control traffic.
10. Length of work space should be based on the ability of flaggers to communicate.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain adequate stopping sight distance to the flagger and a queue of stopped vehicles (see table above).
12. Channelizing devices on the center-line may be omitted when a pilot car is leading traffic and approved by the Engineer.
13. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situations.

Texas Department of Transportation

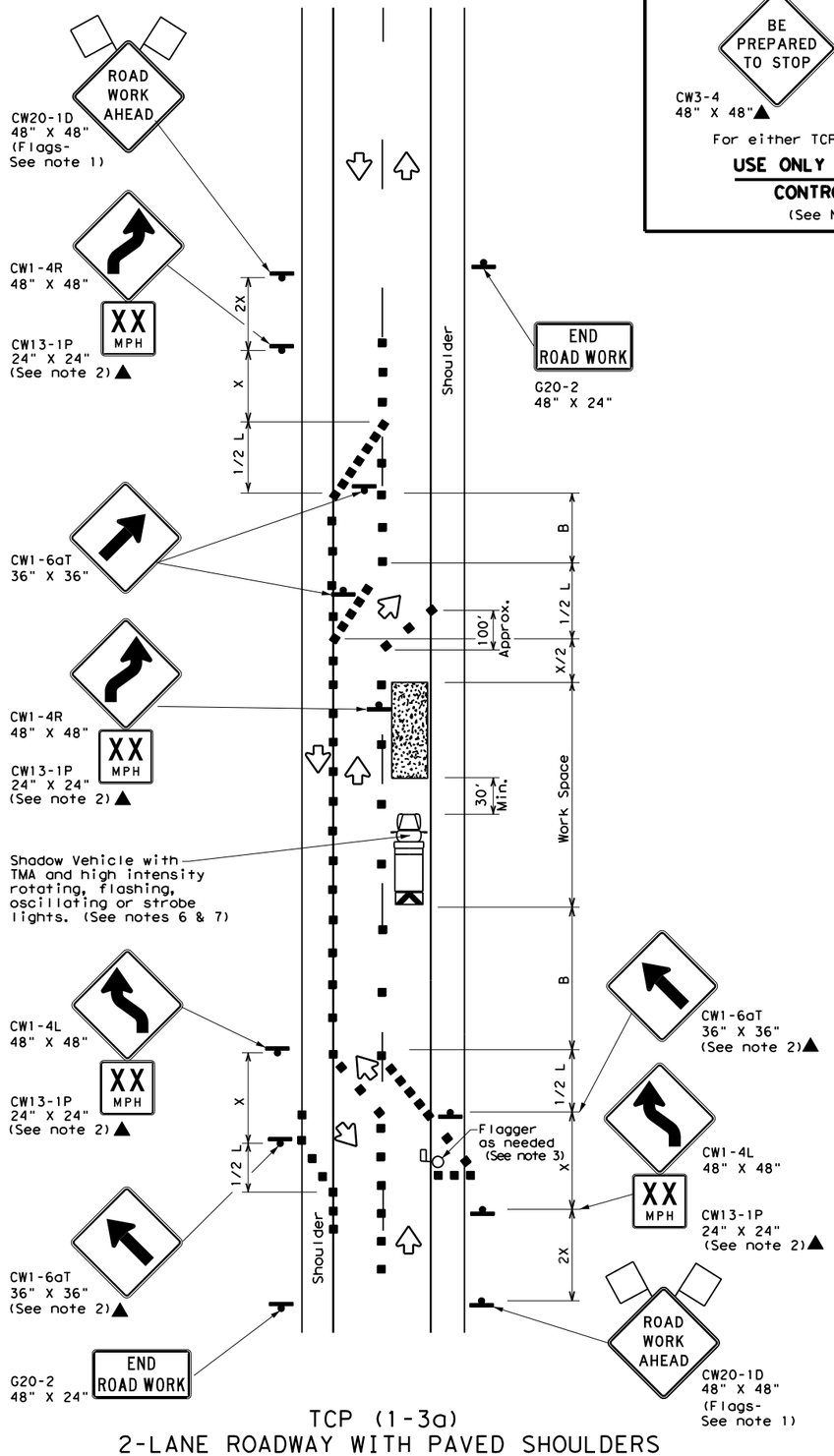
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

TCP(1-2)-18

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REVISIONS 4-90 4-98 2-94 2-12 1-97 2-18				HILLSIDE TER
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	AUS	HAYS		75

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TCP (1-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

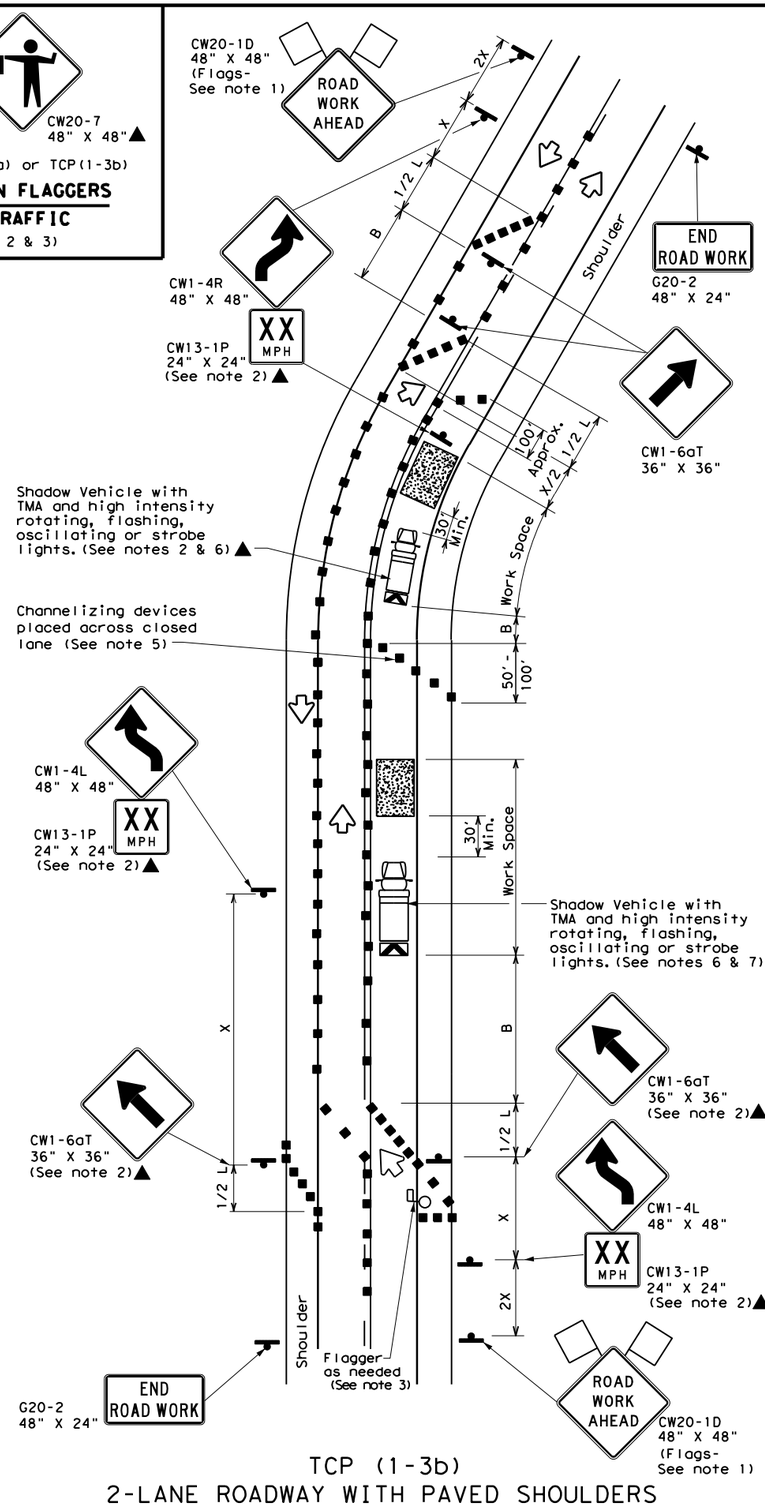
ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



For either TCP(1-3a) or TCP(1-3b)

USE ONLY WHEN FLAGGERS CONTROL TRAFFIC

(See Notes 2 & 3)



TCP (1-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Additional flaggers may be positioned in advance of traffic queues to alert traffic to reduce speed.
4. DO NOT PASS, PASS WITH CARE and construction regulatory speed zone signs may be installed downstream of the ROAD WORK AHEAD signs.
5. When the work zone is made up of several work spaces, channelizing devices should be placed laterally across the closed lane to re-emphasize closure. Laterally placed channelizing devices should be repeated every 500 to 1000 feet in urban areas and every 1/4 to 1/2 mile in rural areas.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
8. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20', or 15' if posted speed are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the area of conflicting markings not the entire work zone.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO LANE ROADS

TCP(1-3)-18

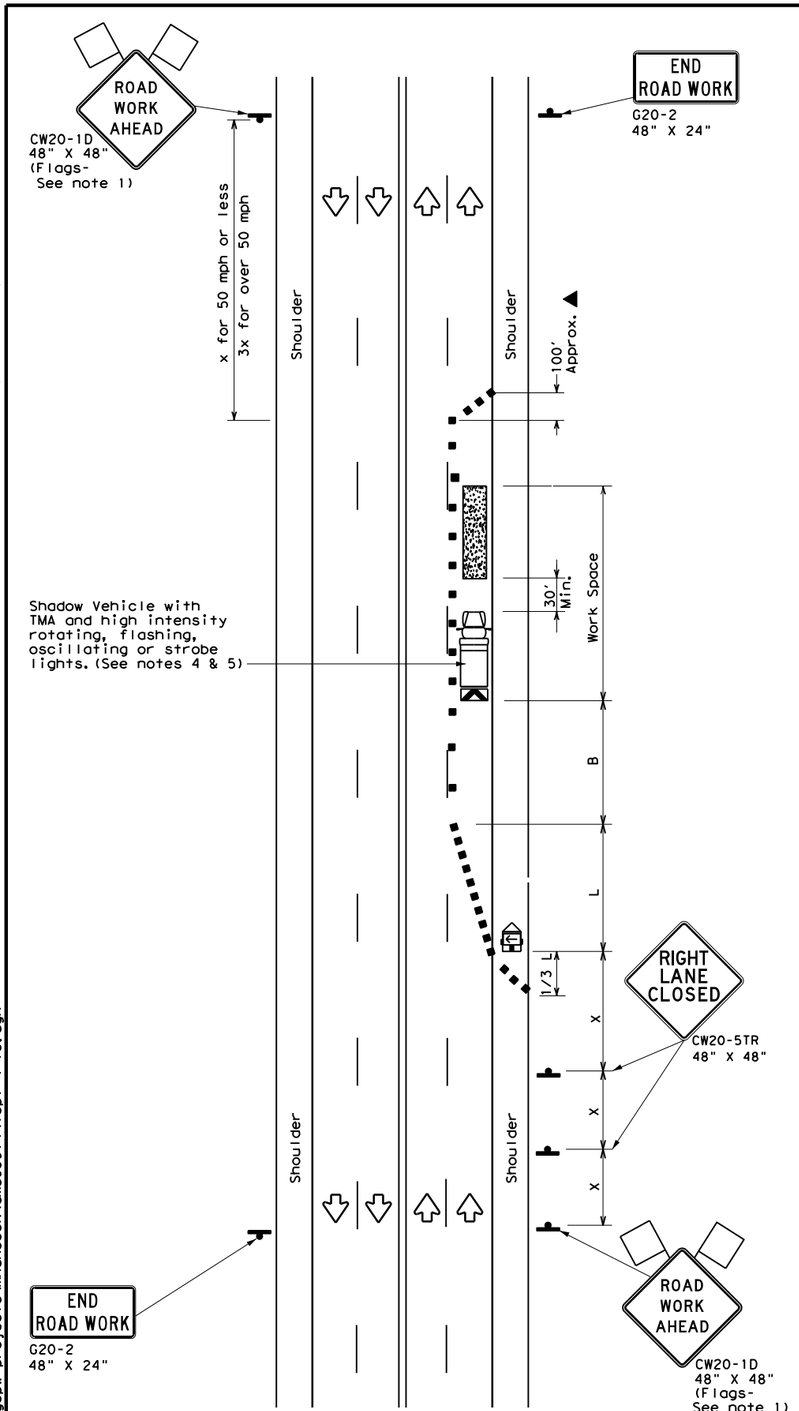
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REVISIONS				HILLSIDE TER
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUS	HAYS		76
1-97 2-18				

153

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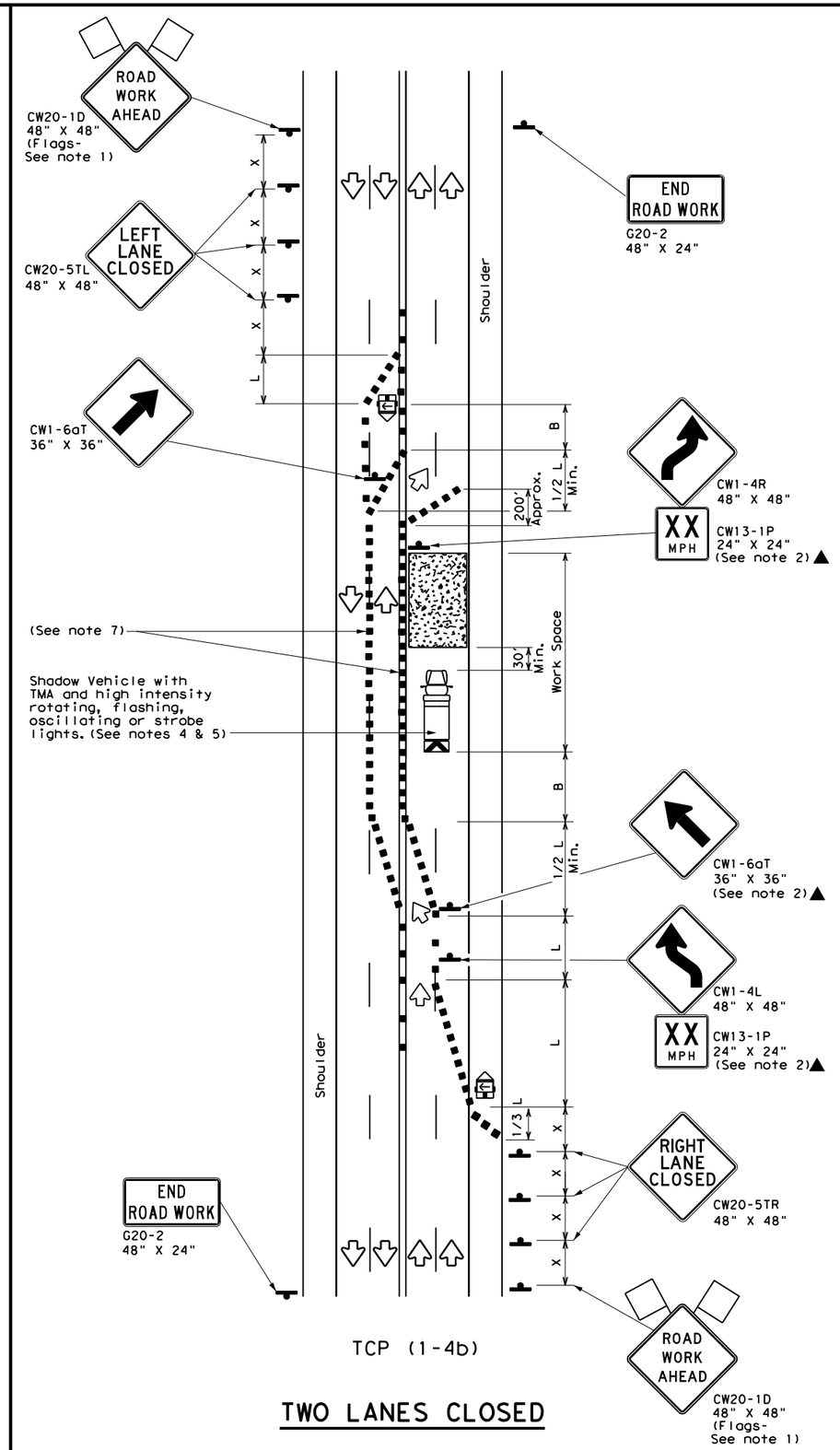
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TCP (1-4a)

ONE LANE CLOSED



TCP (1-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L = WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW20-1D "ROAD WORK AHEAD" sign may be repeated if the visibility of the work zone is less than 1500 feet.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.

TCP (1-4a)

6. If this TCP is used for a left lane closure , CW20-5TL "LEFT LANE CLOSED" signs shall be used and channelizing devices shall be placed on the centerline where needed to protect the work space from opposing traffic with the arrow panel placed in the closed lane near the end of the merging taper.

TCP (1-4b)

7. Where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2S where S is the speed in mph. This tighter device spacing is intended for the areas of conflicting markings, not the entire work zone.

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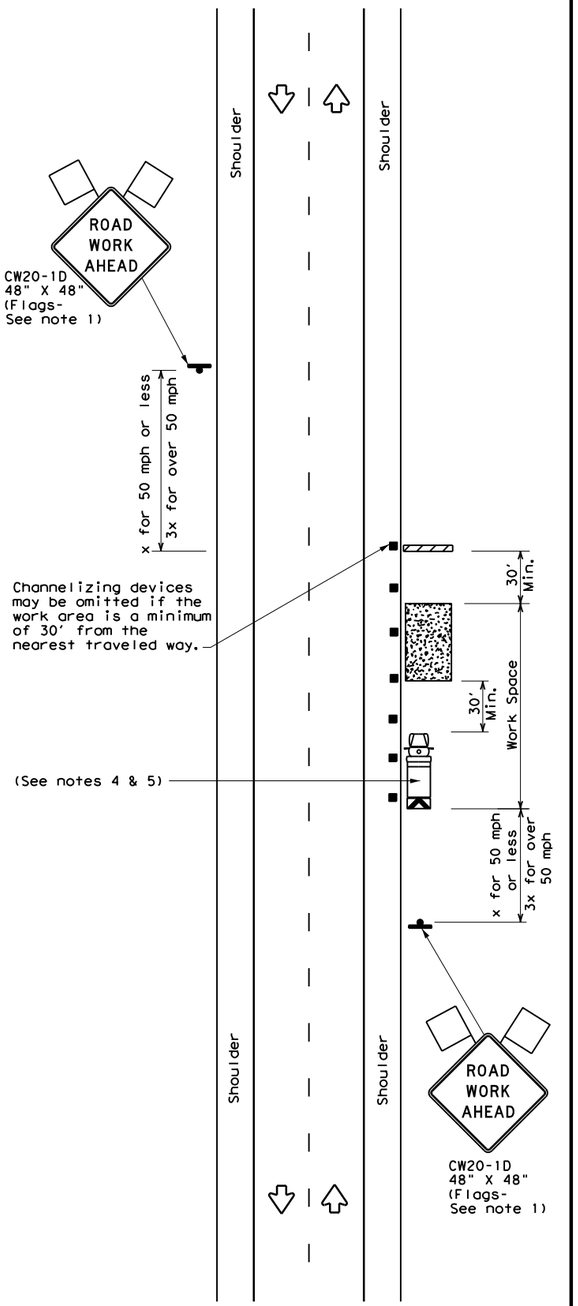
Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(1-4)-18

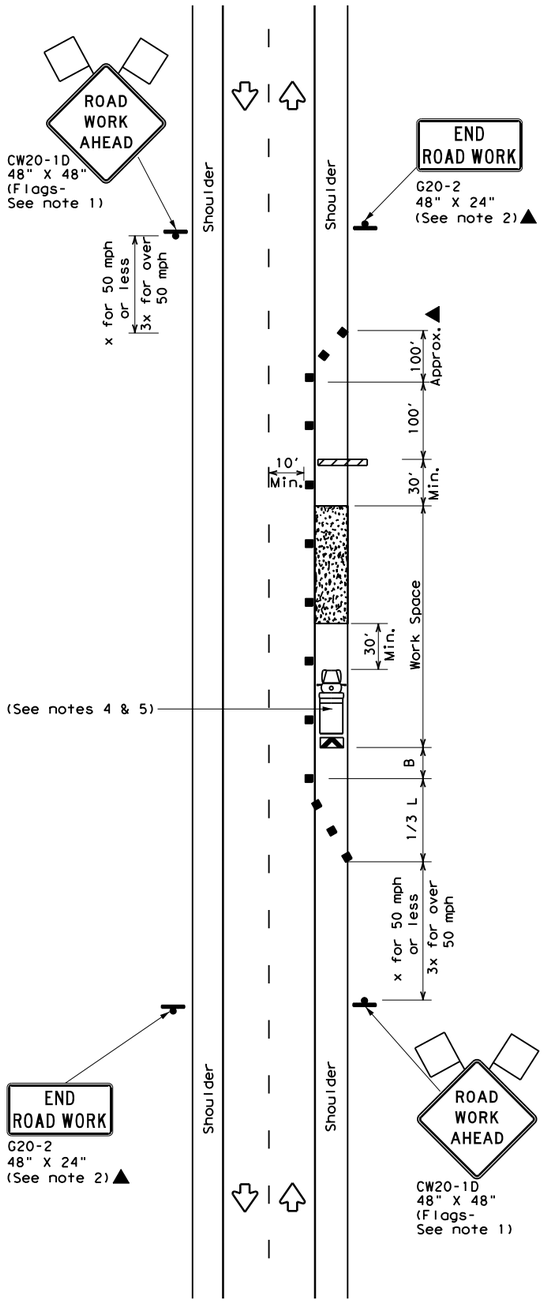
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUS	HAYS		77
1-97 2-18				

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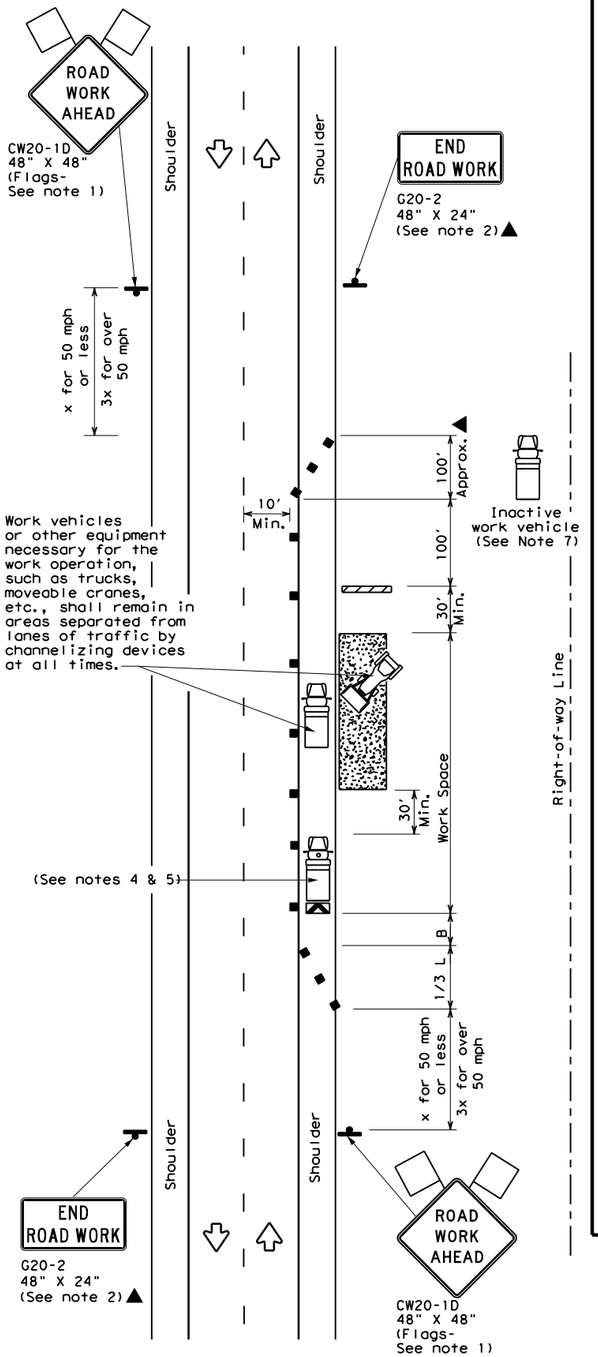
TCP (2-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (2-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (2-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated in the plans, or for routine maintenance work, when approved by the Engineer.
3. Stockpiled material should be placed a minimum of 30 feet from nearest traveled way.
4. Shadow Vehicle with TMA and high intensity rotating, flashing, oscillating or strobe lights. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.
6. See TCP(5-1) for shoulder work on divided highways, expressways and freeways.
7. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
8. CW21-5 "SHOULDER WORK" signs may be used in place of CW21-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation

Traffic Operations Division Standard

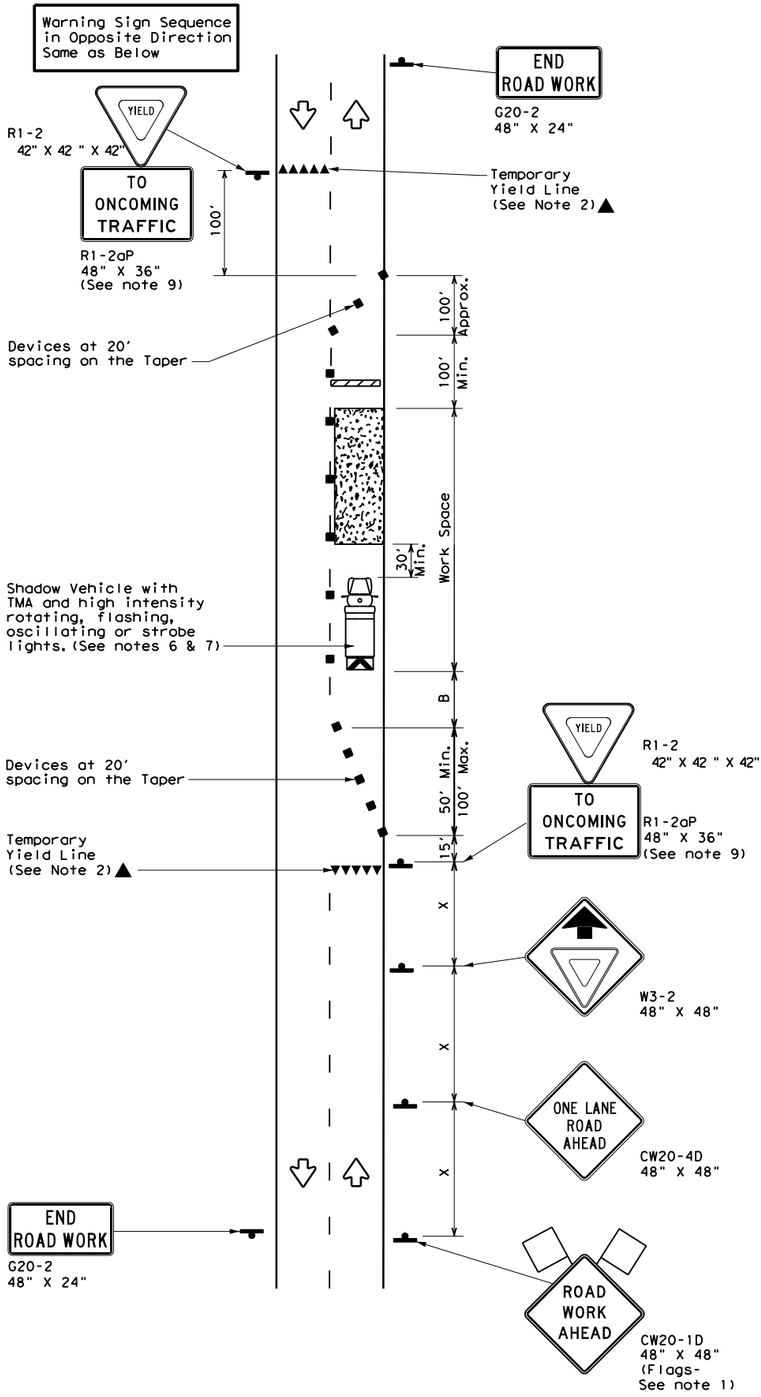
TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(2-1)-18

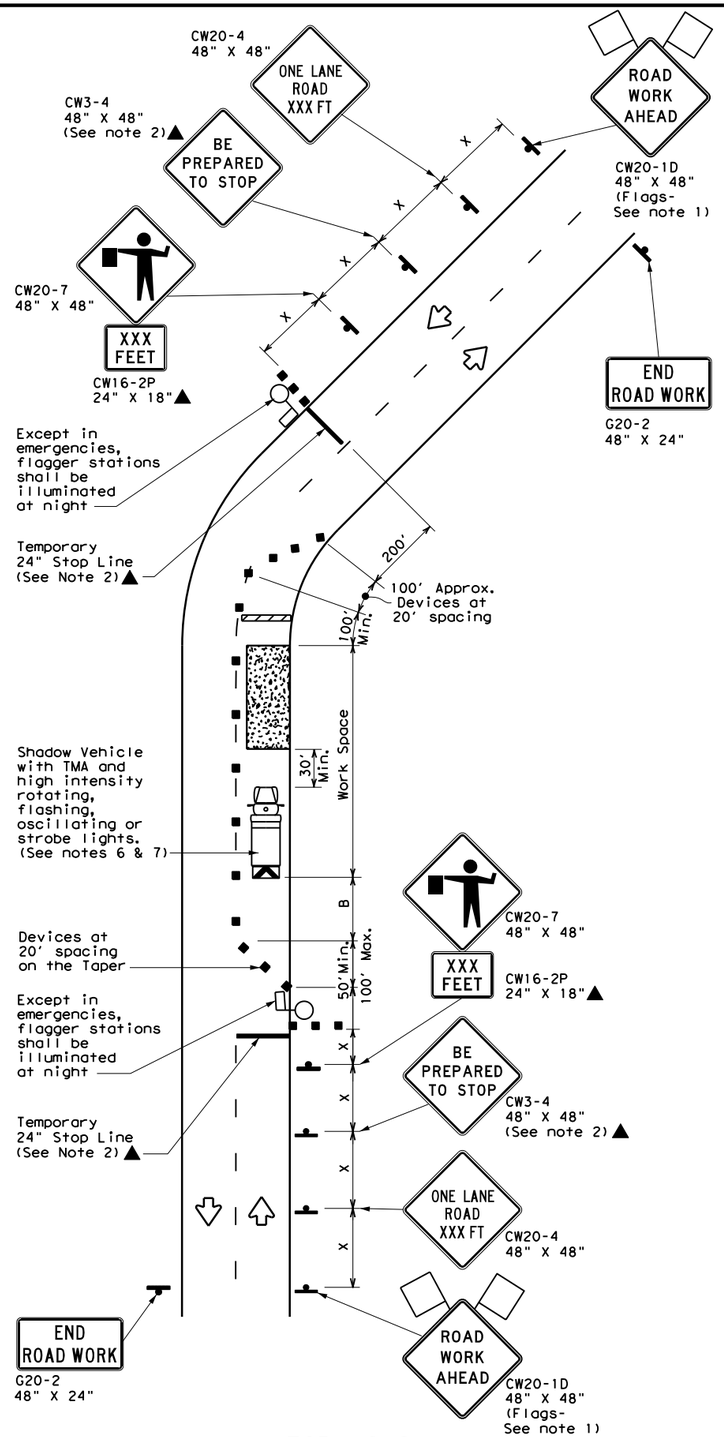
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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12	AUS	HAYS		78
1-97 2-18				

DATE: 1/27/2023 2:01:49 PM
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TCP (2-2a)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH YIELD SIGNS
(Less than 2000 ADT - See Note 9)



TCP (2-2b)
2-LANE ROADWAY WITHOUT PAVED SHOULDERS
ONE LANE TWO-WAY
CONTROL WITH FLAGGERS

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'	200'
35		205'	225'	245'	35'	70'	160'	120'	250'
40		265'	295'	320'	40'	80'	240'	155'	305'
45	L=WS	450'	495'	540'	45'	90'	320'	195'	360'
50		500'	550'	600'	50'	100'	400'	240'	425'
55		550'	605'	660'	55'	110'	500'	295'	495'
60		600'	660'	720'	60'	120'	600'	350'	570'
65		650'	715'	780'	65'	130'	700'	410'	645'
70		700'	770'	840'	70'	140'	800'	475'	730'
75		750'	825'	900'	75'	150'	900'	540'	820'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The CW3-4 "BE PREPARED TO STOP" sign may be installed after the CW20-4 "ONE LANE ROAD XXX FT" sign, but proper sign spacing shall be maintained.
4. Flaggers should use two-way radios or other methods of communication to control traffic.
5. Length of work space should be based on the ability of flaggers to communicate.
6. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
7. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-2a)

8. The R1-2 "YIELD" sign traffic control may be used on projects with approaches that have adequate sight distance. For projects in urban areas, work space should be no longer than one half city block. In rural areas, roadways with less than 2000 ADT, work space should be no longer than 400 feet.
9. The R1-2aP "YIELD TO ONCOMING TRAFFIC" sign shall be placed on a support at a 7 foot minimum mounting height.

TCP (2-2b)

10. Channelizing devices on the center line may be omitted when a pilot car is leading traffic and approved by the Engineer.
11. If the work space is located near a horizontal or vertical curve, the buffer distances should be increased in order to maintain stopping sight distance to the flagger and a queue of stopped vehicles. (See table above).
12. Flaggers should use 24" STOP/SLOW paddles to control traffic. Flags should be limited to emergency situtations.

Texas Department of Transportation | *Traffic Operations Division Standard*

TRAFFIC CONTROL PLAN
ONE-LANE TWO-WAY
TRAFFIC CONTROL

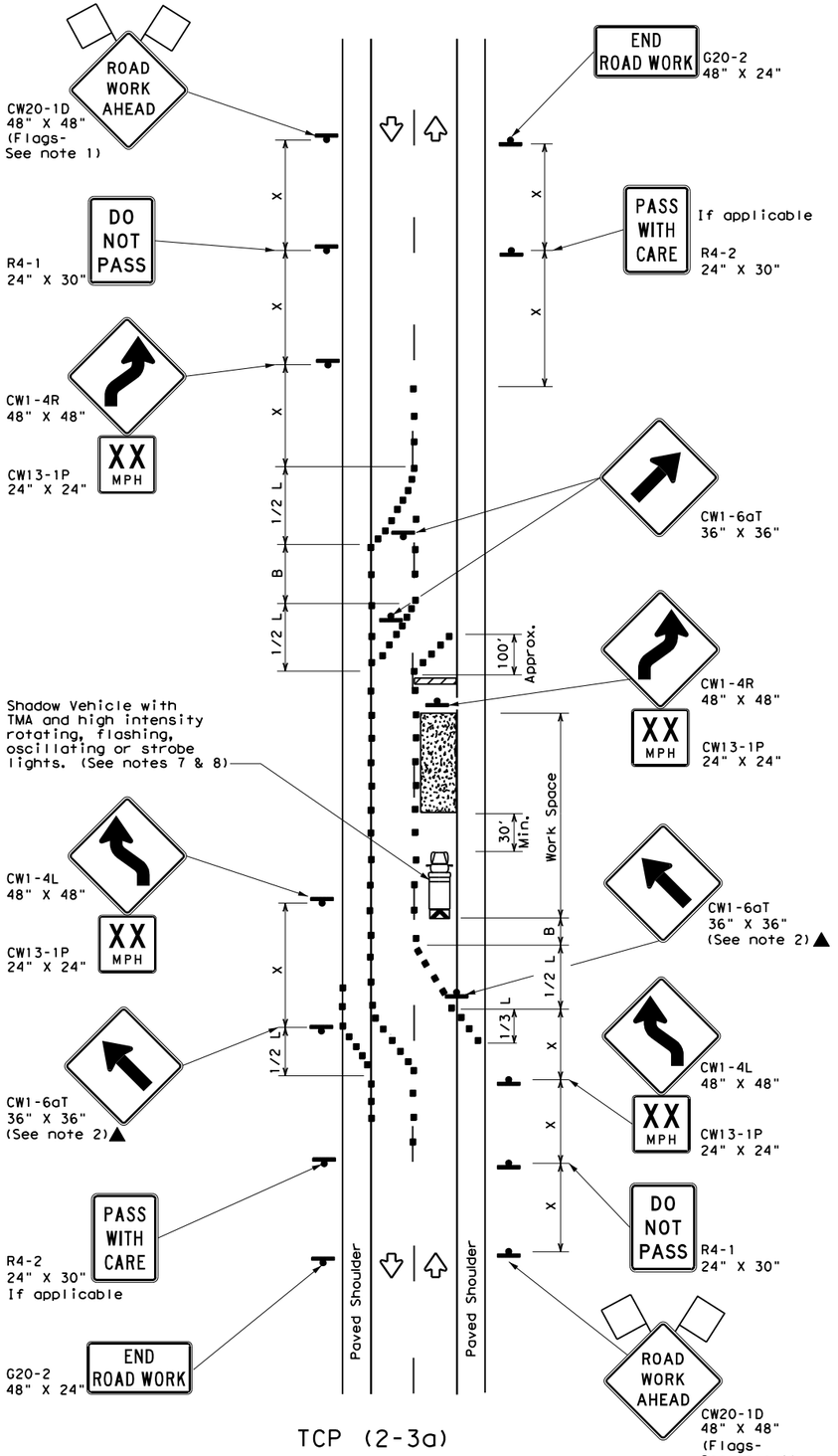
TCP(2-2)-18

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REVISIONS				HILLSIDE TER
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	AUS	HAYS		79
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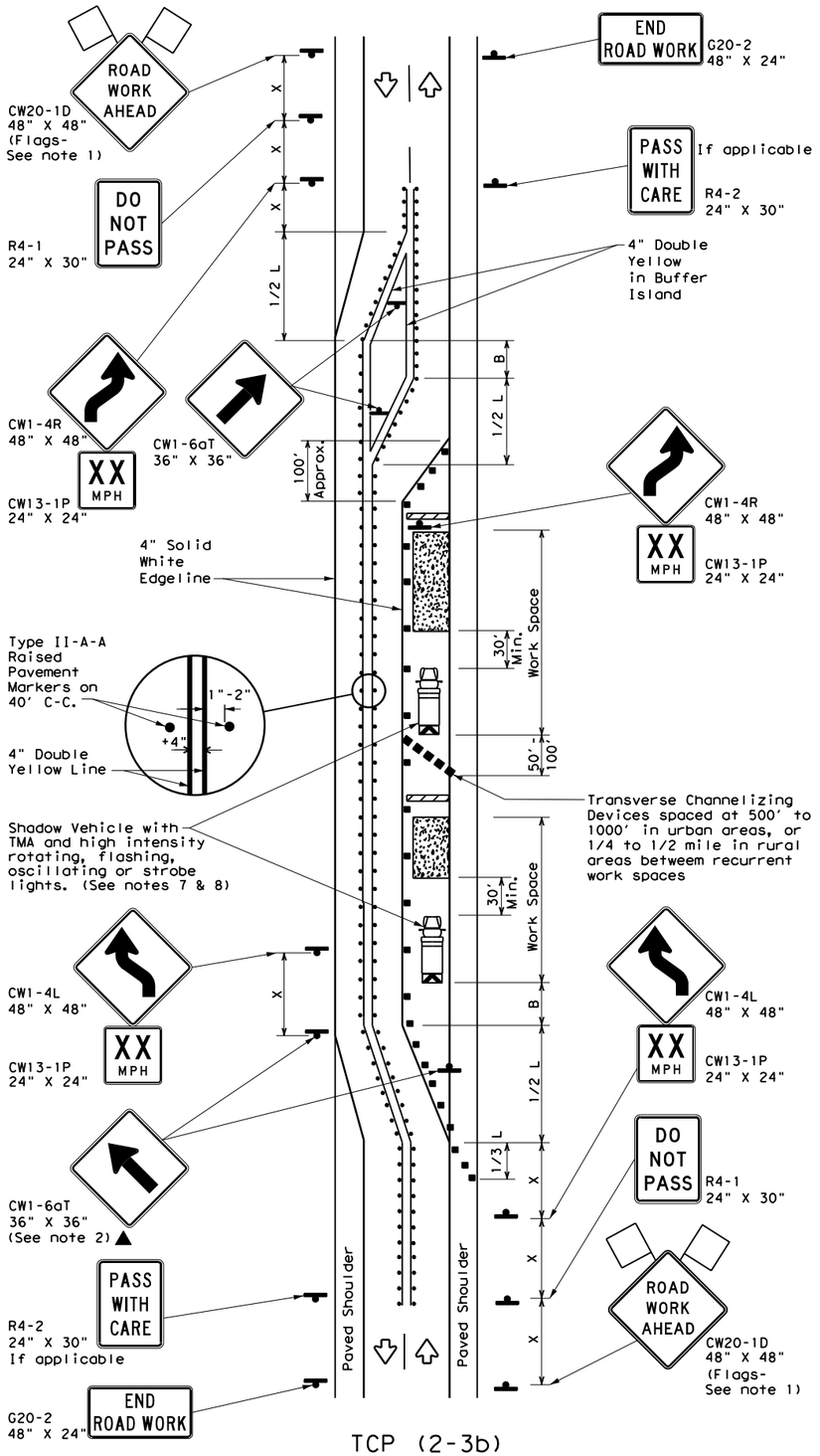
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TCP (2-3a)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
ADEQUATE FIELD OF VIEW



TCP (2-3b)
2-LANE ROADWAY WITH PAVED SHOULDERS

ONE LANE CLOSED
INADEQUATE FIELD OF VIEW

LEGEND			
	Type 3 Barricade	■ ■	Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	• • • •	Raised Pavement Markers Ty II-AA
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
				TCP(2-3b)ONLY
			✓	✓

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. When work space will be in place less than three days existing pavement markings may remain in place. Channelizing devices shall be used to separate traffic.
4. Flagger control should NOT be used unless roadway conditions or heavy traffic volume require additional emphasis to safely control traffic. Flagger should be positioned at end of traffic queue.
5. The R4-1 "DO NOT PASS," R4-2 " PASS WITH CARE" and construction regulatory speed zone signs may be installed within CW20-1D "ROAD WORK AHEAD" signs. Proper spacing of signs shall be maintained.
6. Conflicting pavement marking shall be removed for long term projects.
7. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted.
8. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-3a)

9. Conflicting pavement markings shall be removed for long-term projects. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter device spacing is intended for the area of the conflicting markings, not the entire work zone.

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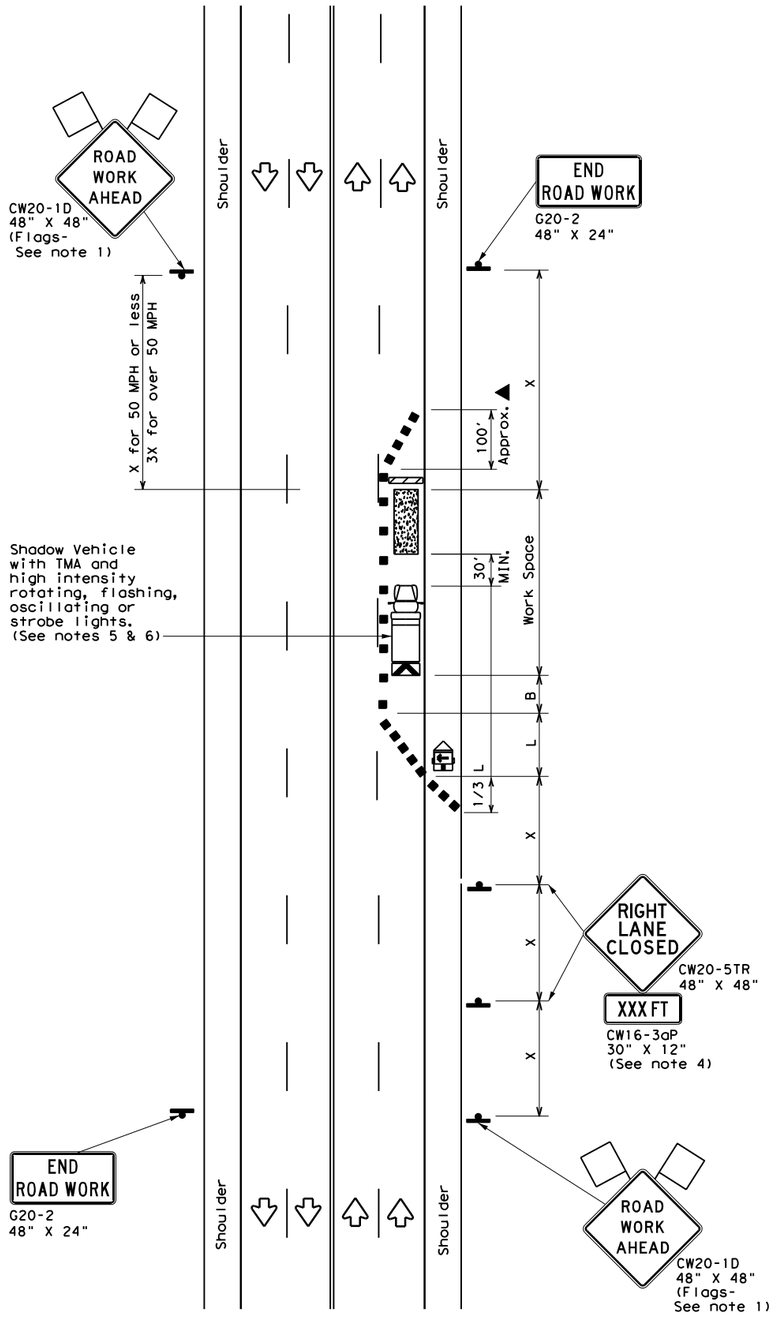
TRAFFIC CONTROL PLAN TRAFFIC SHIFTS ON TWO-LANE ROADS

TCP(2-3)-18

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© TxDOT December 1985	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
8-95 3-03	DIST	COUNTY		SHEET NO.
1-97 2-12	AUS	HAYS		80
4-98 2-18				

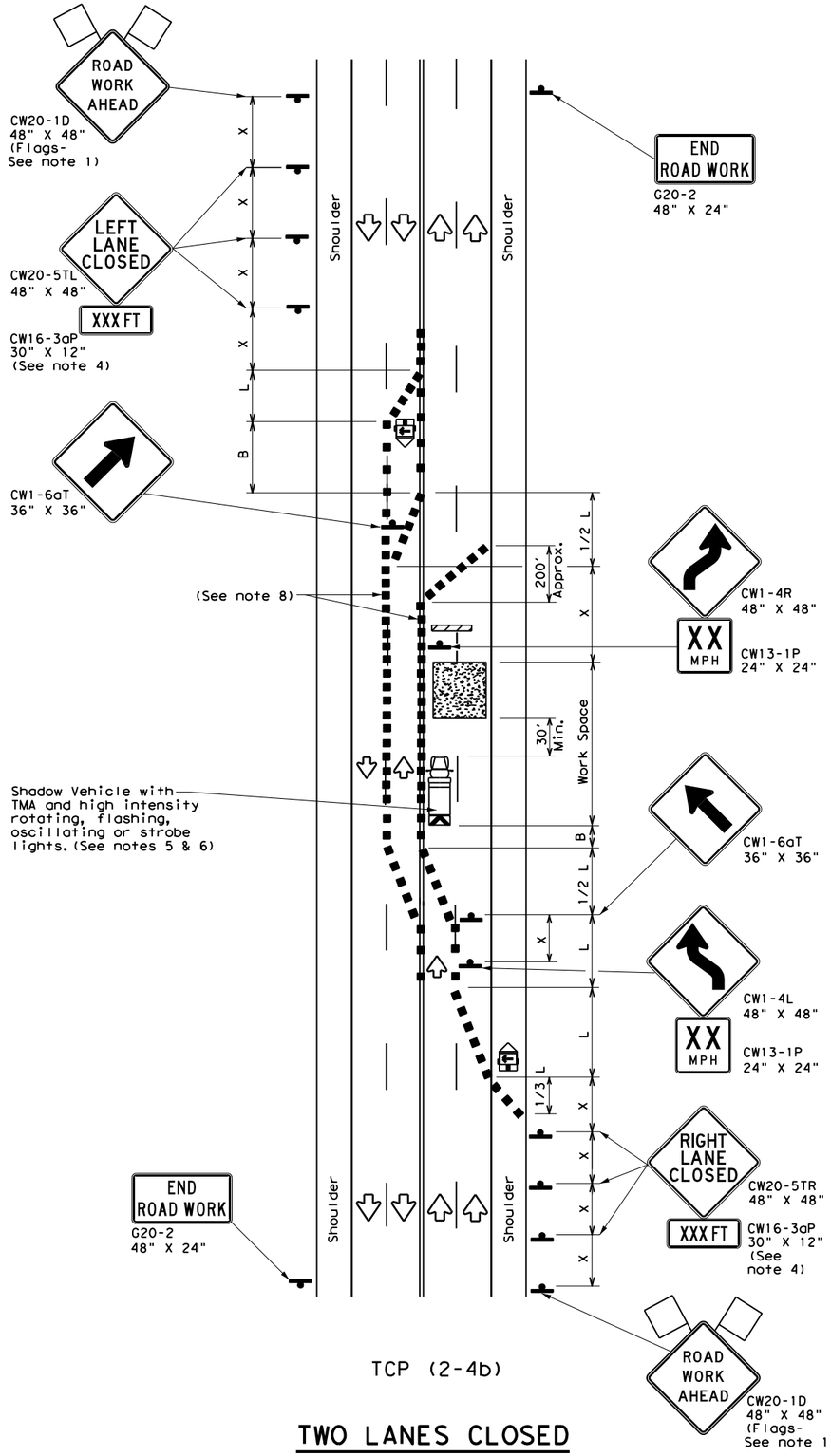
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TCP (2-4a)

ONE LANE CLOSED



TCP (2-4b)

TWO LANES CLOSED

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices: On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
		✓	✓	

GENERAL NOTES

1. Flags attached to signs where shown, are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. The downstream taper is optional. When used, it should be 100 feet minimum length per lane.
4. For short term applications, when post mounted signs are not used, the distance legend may be shown on the sign face rather than on a CW16-3aP supplemental plaque.
5. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
6. Additional Shadow Vehicles with TMAs may be positioned in each closed lane, on the shoulder or off the paved surface, next to those shown in order to protect a wider work space.

TCP (2-4a)

7. If this TCP is used for a left lane closure, CW20-5TL "LEFT LANE CLOSED"signs shall be used and channelizing devices shall be placed on the centerline to protect the work space from opposing traffic with the arrow board placed in the closed lane near the end of the merging taper.

TCP (2-4b)

8. For shorter durations where traffic is directed over a yellow centerline, channelizing devices which separate two-way traffic should be spaced on tapers at 20' or 15' if posted speeds are 35 mph or slower, and for tangent sections, at 1/2(S) where S is the speed in mph. This tighter devices spacing is intended for the area of conflicting markings, not the entire work zone.

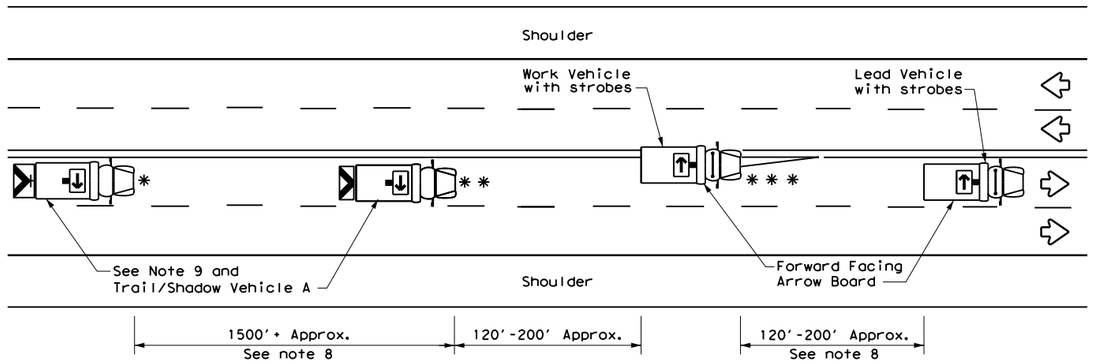
Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN LANE CLOSURES ON MULTILANE CONVENTIONAL ROADS

TCP(2-4)-18

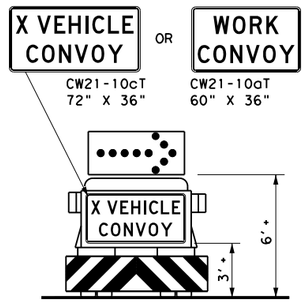
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1-97 2-12	DIST	COUNTY		SHEET NO.
4-98 2-18	AUS	HAYS		81

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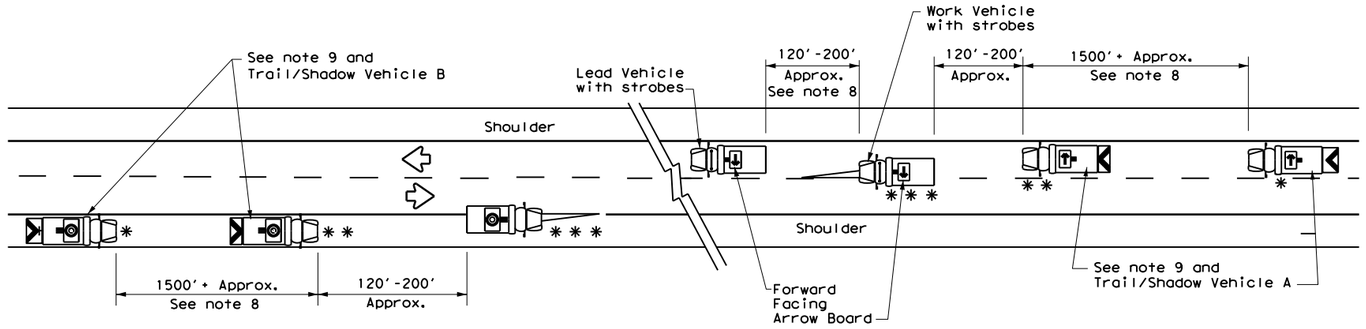
TCP (3-1a)

UNDIVIDED MULTILANE ROADWAY



TRAIL/SHADOW VEHICLE A

with RIGHT Directional display Flashing Arrow Board

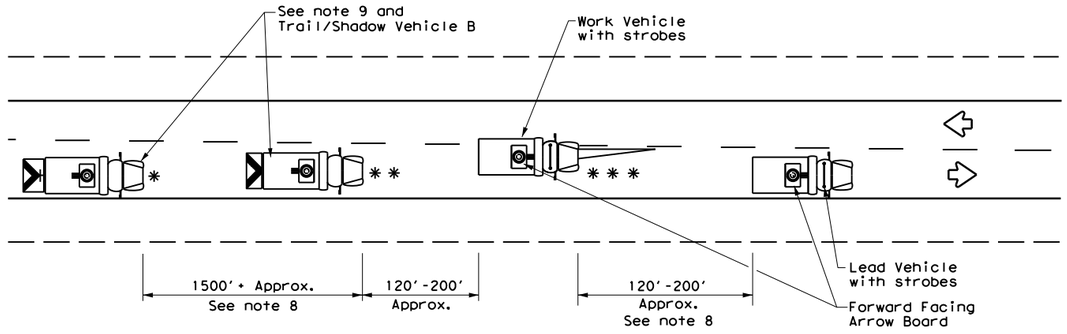


WORK ON SHOULDER

WORK ON TRAVEL LANE

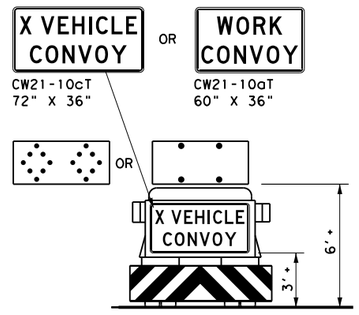
TCP (3-1b)

TWO-WAY ROADWAY WITH PAVED SHOULDERS



TCP (3-1c)

TWO-WAY ROADWAY WITHOUT PAVED SHOULDERS



TRAIL/SHADOW VEHICLE B

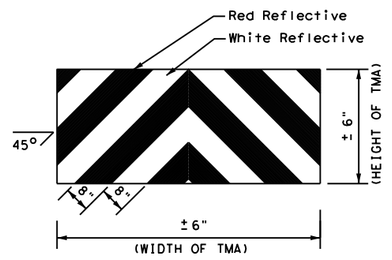
with Flashing Arrow Board in CAUTION display

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
* *	Shadow Vehicle		
* * *	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used the WORK vehicle must be equiped with an arrow board. The Engineer will determine if the LEAD VEHICLE and/or TRAIL VEHICLE are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. "X VEHICLE CONVOY" (CW21-10cT) or "WORK CONVOY" (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" X 48" diamond shaped "WORK CONVOY"(CW21-10T) or "X VEHICLE CONVOY" (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The "X VEHICLE CONVOY" sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a "DO NOT PASS" (R4-1) sign should be placed on the back of the rearmost protection vehicle.



STRIPING FOR TMA

Texas Department of Transportation

Traffic Operations Division Standard

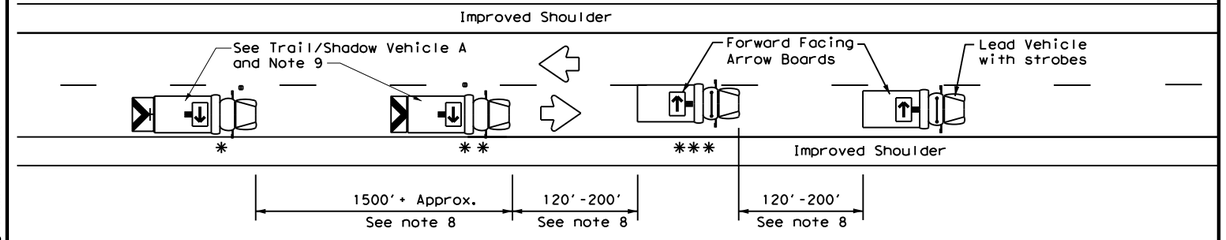
TRAFFIC CONTROL PLAN MOBILE OPERATIONS UNDIVIDED HIGHWAYS

TCP(3-1)-13

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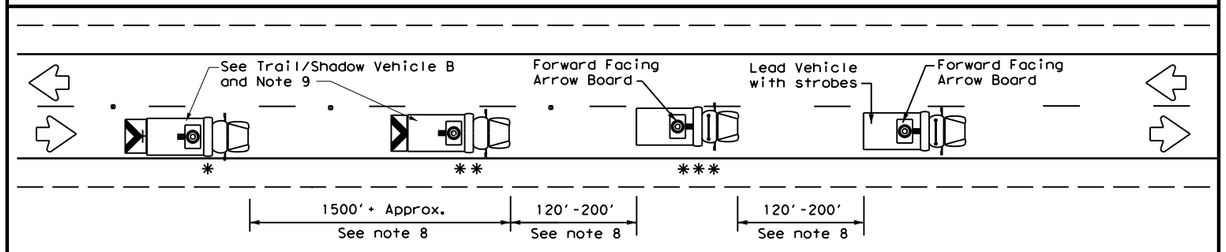
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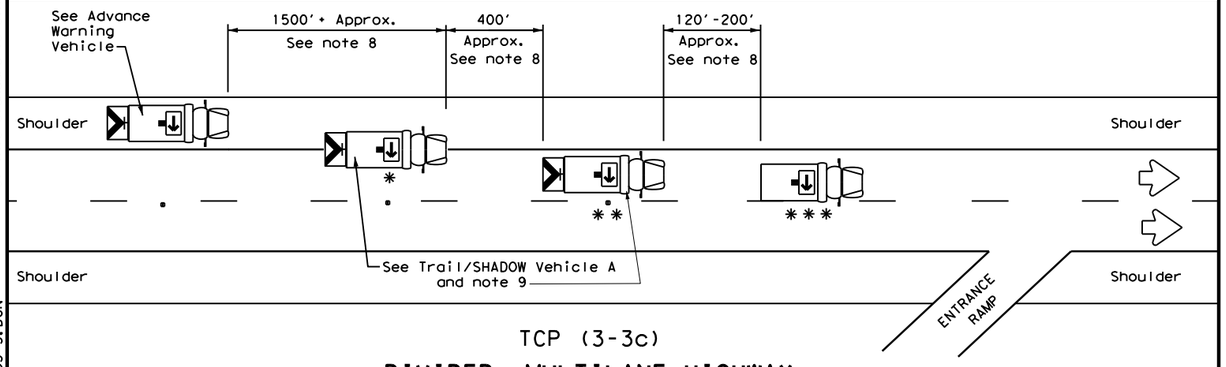
TCP (3-3a)

TWO LANE HIGHWAY WITH PAVED SHOULDERS
(WORK ON TRAVEL LANE)



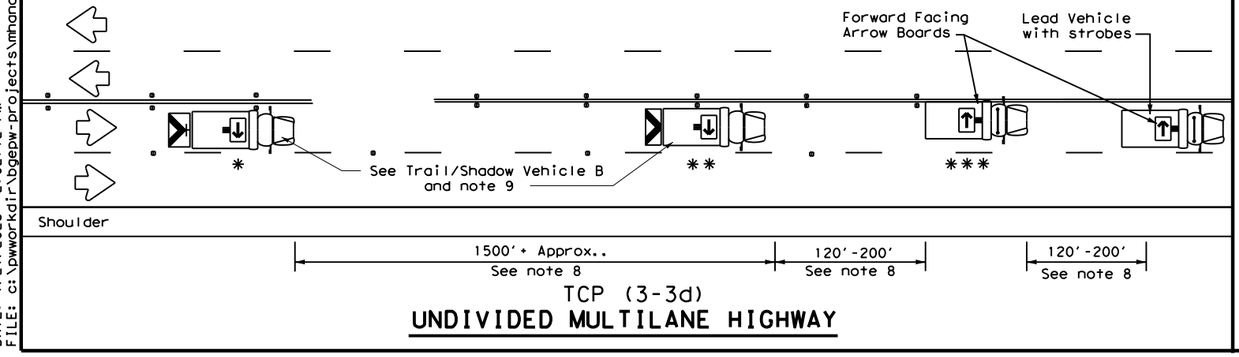
TCP (3-3b)

TWO LANE HIGHWAY WITHOUT PAVED SHOULDERS
(WORK ON TRAVEL LANE)



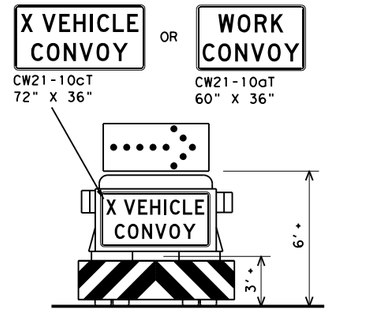
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DIVIDED MULTILANE HIGHWAY



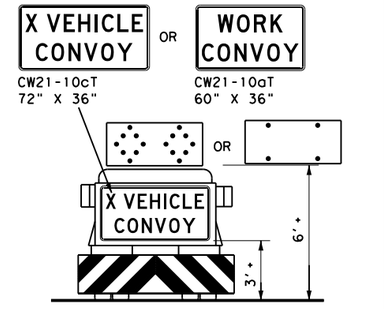
TCP (3-3d)

UNDIVIDED MULTILANE HIGHWAY



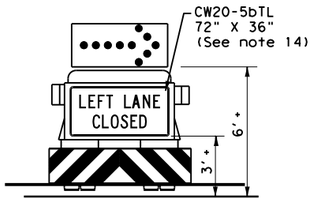
TRAIL/SHADOW VEHICLE A

with RIGHT Directional display
Flashing Arrow Board

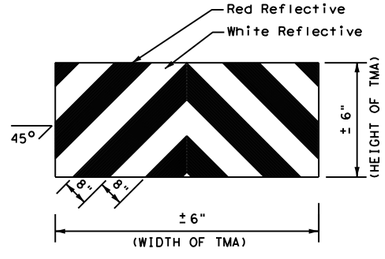


TRAIL/SHADOW VEHICLE B

with Flashing Arrow Board
in Caution Mode



ADVANCE WARNING VEHICLE



STRIPING FOR TMA

LEGEND			
*	Trail Vehicle	ARROW BOARD DISPLAY	
**	Shadow Vehicle		
***	Work Vehicle		RIGHT Directional
	Heavy Work Vehicle		LEFT Directional
	Truck Mounted Attenuator (TMA)		Double Arrow
	Traffic Flow		CAUTION (Alternating Diamond or 4 Corner Flash)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
✓				

GENERAL NOTES

1. TRAIL, SHADOW, and LEAD vehicles shall be equipped with arrow boards as illustrated. When a LEAD vehicle is not used on two way roads the WORK vehicle must have an arrow board. For divided roadways, the arrow board on the WORK vehicle is optional based on the type of work being performed. The Engineer will determine if the LEAD vehicle and/or TRAIL vehicle are required based on prevailing roadway conditions, traffic volume, and sight distance restrictions.
2. The use of amber high intensity rotating, flashing, oscillating, or strobe lights on vehicles are required. Blue high intensity rotating, flashing, oscillating, or strobe lights when mounted on the driver's side of the vehicle may be operated simultaneously with the amber beacons or strobe lights.
3. The use of truck mounted attenuators (TMA) on the SHADOW VEHICLE, ADVANCE WARNING and TRAIL VEHICLE are required.
4. Reflective sheeting on the rear of the TMA shall meet or exceed the reflectivity and color requirements of DEPARTMENTAL MATERIAL SPECIFICATION DMS 8300, Type A.
5. Flashing arrow boards shall be Type B or Type C as per the Barricade and Construction (BC) standards. The board shall be controlled from inside the vehicle.
6. Each vehicle shall have two-way radio communication capability.
7. When work convoys must change lanes, the TRAIL VEHICLE should change lanes first to shadow the other convoy vehicles.
8. Vehicle spacing between the TRAIL VEHICLE and the SHADOW VEHICLE will vary depending on sight distance restrictions. Motorists approaching the convoy should be able to see the TRAIL VEHICLE in time to slow down and/or change lanes as they approach the TRAIL VEHICLE. Vehicle spacing between the WORK VEHICLE and SHADOW VEHICLE and vehicle spacing between WORK VEHICLE and LEAD VEHICLE may vary according to terrain, work activity and other factors.
9. X VEHICLE CONVOY (CW21-10cT) or WORK CONVOY (CW21-10aT) signs shall be used on TRAIL VEHICLES and SHADOW VEHICLES as shown. As an option 48" x 48" diamond shaped WORK CONVOY (CW21-10T) or X VEHICLE CONVOY (CW21-10bT) signs may be used where adequate mounting space exists. When used, the X VEHICLE CONVOY sign shall have the number of the convoy vehicles displayed on the sign in the number designation "X" location. The X VEHICLE CONVOY sign shall not be used on the SHADOW VEHICLE if a TRAIL VEHICLE is used.
10. For divided highways with two or three lanes in one direction, the appropriate LEFT LANE CLOSED (CW20-5bTL), RIGHT LANE CLOSED (CW20-5bTR), or CENTER LANE CLOSED (CW20-5dT) sign should be used on the Advance Warning Vehicle. As an option, a portable changeable message sign (PCMS) or truck mounted changeable message sign (TMCMS) with a minimum character height of 12", and displaying the same legend may be substituted for these signs. An appropriate directional arrow display, simulating the size and legibility of the flashing arrow board may be used in the second phase of the PCMS/TMCMS message. When this is done, the arrow board will not be required on the Advance Warning Vehicle.
11. A double arrow shall not be displayed on the arrow board on the Advance Warning Vehicle.
12. For divided highways with three or four lanes in each direction, use TCP(3-2).
13. Standard diamond shape versions of the CW20-5 series signs may be used as an option if the rectangular signs shown are not available.
14. The Advance Warning Vehicle may straddle the edgeline when Shoulder width makes it necessary.
15. On two-lane two-way roadways, the work and protection vehicles should pull over periodically to allow motor vehicle traffic to pass. If motorists are not allowed to pass the work convoy, a DO NOT PASS (R4-1) sign should be placed on the back of the rearmost protection vehicle.

Texas Department of Transportation

Traffic Operations Division Standard

TRAFFIC CONTROL PLAN
MOBILE OPERATIONS
RAISED PAVEMENT MARKER INSTALLATION/ REMOVAL
TCP(3-3)-14

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1-97 7-14	AUS	HAYS		83

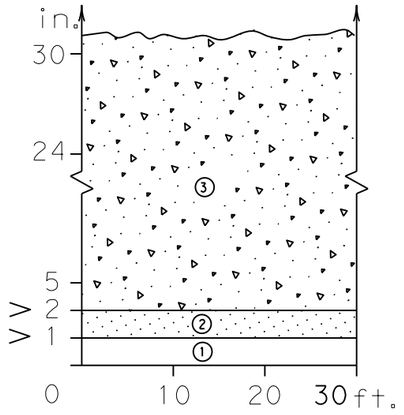
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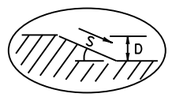
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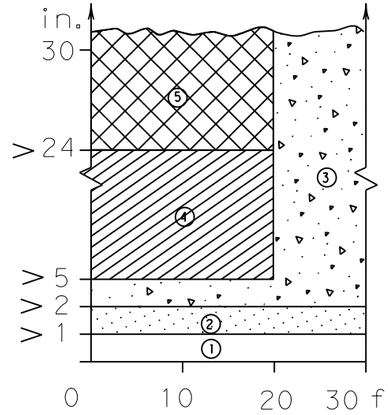
DEFINITION OF TREATMENT ZONES FOR VARIOUS EDGE CONDITIONS

Edge Height (D) in Inches versus Lateral Clearance (Y) in Feet

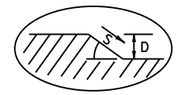


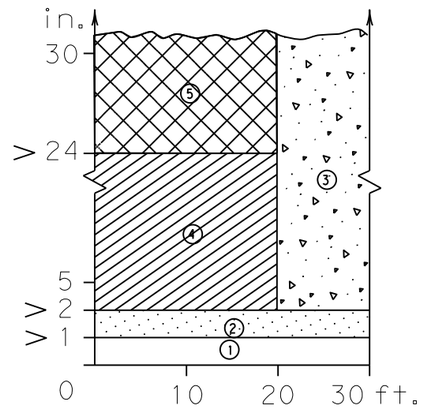
Edge Condition I
S = (3:1) (or flatter)



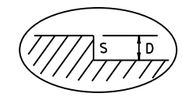


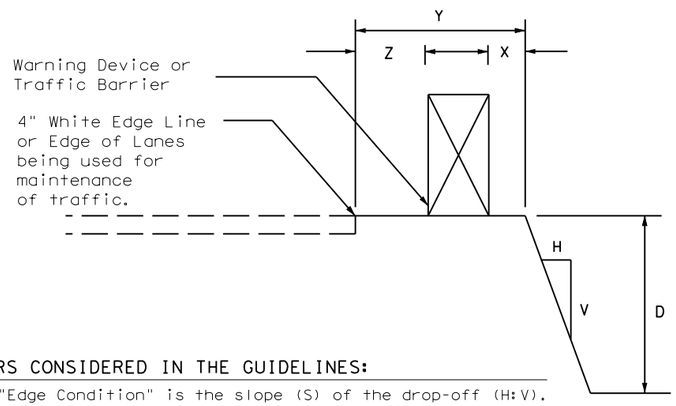
Edge Condition II
S = ((2.99):1) to (1:1)





Edge Condition III
S is steeper than (1:1)





FACTORS CONSIDERED IN THE GUIDELINES:

1. The "Edge Condition" is the slope (S) of the drop-off (H:V). The "Edge Height is the depth of the drop-off "D".

2. Distance "X" is to be the maximum practical under job conditions. Two feet minimum for high speed conditions. Distance "Y" is the lateral clearance from edge of travel lane to edge of dropoff. Distance "Z" does not have a minimum.

3. In addition to the factors considered in the guidelines, each construction zone drop-off situation should be analyzed individually, taking into account other variables, such as: traffic mix, posted speed in the construction zone, horizontal curvature, and the practicality of the treatment options.

4. The conditions for indicating the use of positive or protective barriers are given by Zone-5 and Figure-1. Traffic barriers are primarily applicable for high speed conditions. Urban areas with speeds of 30 mph or less may have a lesser need for signing, delineation, and barriers. Right-angled edges, however, with "D" greater than 2 inches and located within a lateral offset of 6 feet, may indicate a higher level of treatment.

5. If the distance "Y" must be less than 3 feet, the use of a positive barrier may not be feasible. In such a case, consider either: 1) narrowing the lanes to a desired 11 to 12 feet or 10 foot minimum (see CW20-8 sign), or 2) provide an edge slope such as Edge Condition I.

Zone	Treatment Types Guidelines:
①	No treatment
②	CW 8-11 "Uneven Lanes" signs.
③	CW 8-9a Shoulder Drop-Off" or CW 8-11 signs plus vertical panels.
④	CW8-9a or CW 8-11, signs plus drums. Where restricted space precludes the use of drums, use vertical panels. An edge slope to that of the profered Edge Condition I.
⑤	Check indications (Figure-1) for possitive barrier. Where positive barrier is not indicated, the treatment shown above for Zone-4 may be used after consideration of other applicable factors.

Edge Condition Notes:

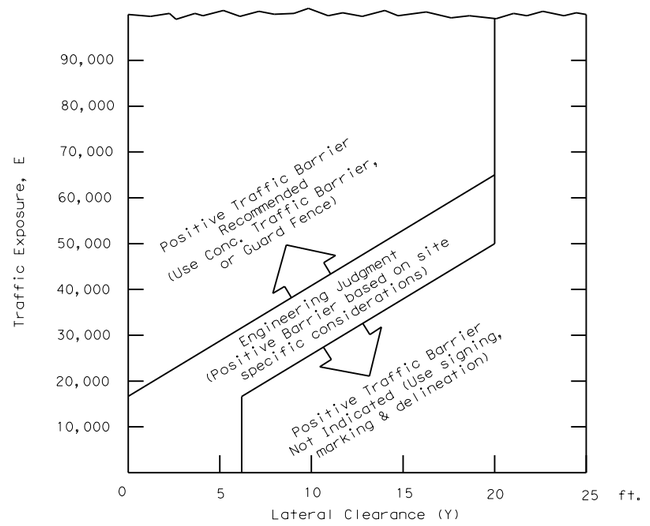
1. Edge Condition I: Most vehicles are able to traverse an edge condition with a slope rate of (3 to 1) or flatter. The slope must be constructed with a compacted material capable of supporting vehicles.

2. Edge Condition II: Most vehicles are able to traverse an edge condition with a slope between (2.99 to 1) and (1 to 1) so long as "D" does not exceed 5 inches. Under-carriage drag on most automobiles will occur when "D" exceeds 6 inches. As "D" exeeds 24 inches, the possibility for rollover is greater in most vehicles.

3. Edge Condition III: When slopes are greater than (1 to 1) and where "D" is greater than 2 inches, a more difficult control factor may exist for some vehicles, if not properly treated. For example, where "D" is greater than 2 inches and up to 24 inches different types of vehicles may experience different steering control at different edge heights. Automobiles might experience more steering control differential when "D" is greater than 2 inches and up to 5 inches. Trucks, particularly those with high loads, have more steering control differential when "D" is greater than 5 inches and up to 24 inches. When "D" exceeds 24 inches, the possibility of rollover is greater for most vehicles.

4. Milling or overlay operations that result in Edge Condition III should not be in place without appropriate warning treatments, and these conditions should not be left in place for extended periods of time.

FIGURE-1: CONDITIONS INDICATING USE OF POSITIVE BARRIER FOR ZONE 5 (▨)



1. E = ADT x T
   Where ADT is that portion of the average daily traffic volume traveling within 20 feet (generally two adjacent lanes) of the edge dropoff condition; and, T is the duration time in years of the dropoff condition.

2. Figure-1 provides a practical approach to the use of positive barriers for the protection of vehicles from pavement drop-offs. Other factors, such as the presence of heavy machinery, construction workers, or the mix and volume of traffic may make the use of positive barriers appropriate, even when the edge condition alone may not justify the use of a barrier.

3. An approved end treatment should be provided for any positive barrier end located within the clear zone.

These guidelines apply to temporary traffic control areas or work zones where continuous pavement edges or drop-offs exists parallel and adjacent to a lane used by traffic. The edge conditions may be present between shoulders and travel lanes, between adjacent or opposing travel lanes, or at intermediate points across the width of the paved surface. Due to the variability in construction operations, tolerances in the variables may be allowed by the engineer. These guidelines do not apply to short term operations. These guidelines do not constitute a rigid standard or policy; rather, they are guidance to be used in conjunction with engineering judgement. These guidelines may be updated on the Design Division's on-line manuals.

Engineer's Seal

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

Date 1/27/2023

Texas Department of Transportation

Traffic Safety Division Standard

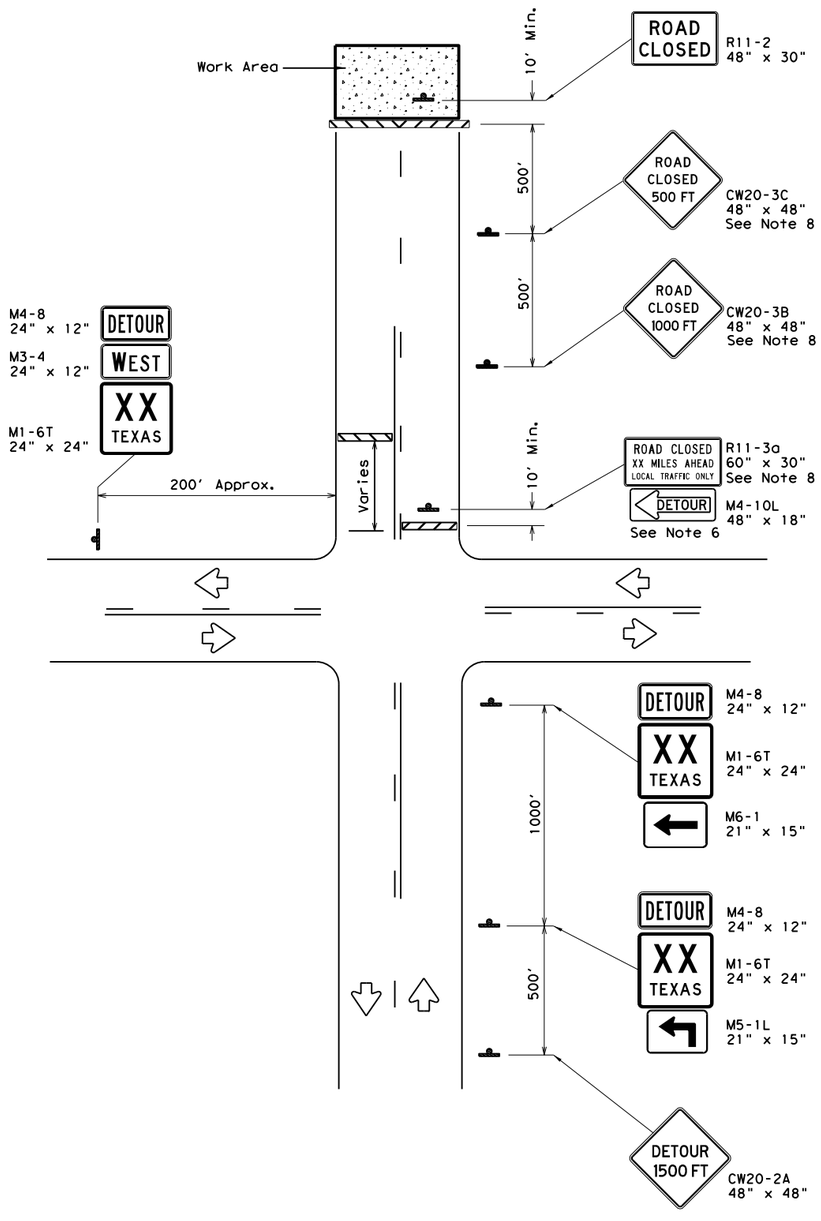
TREATMENT FOR VARIOUS EDGE CONDITIONS

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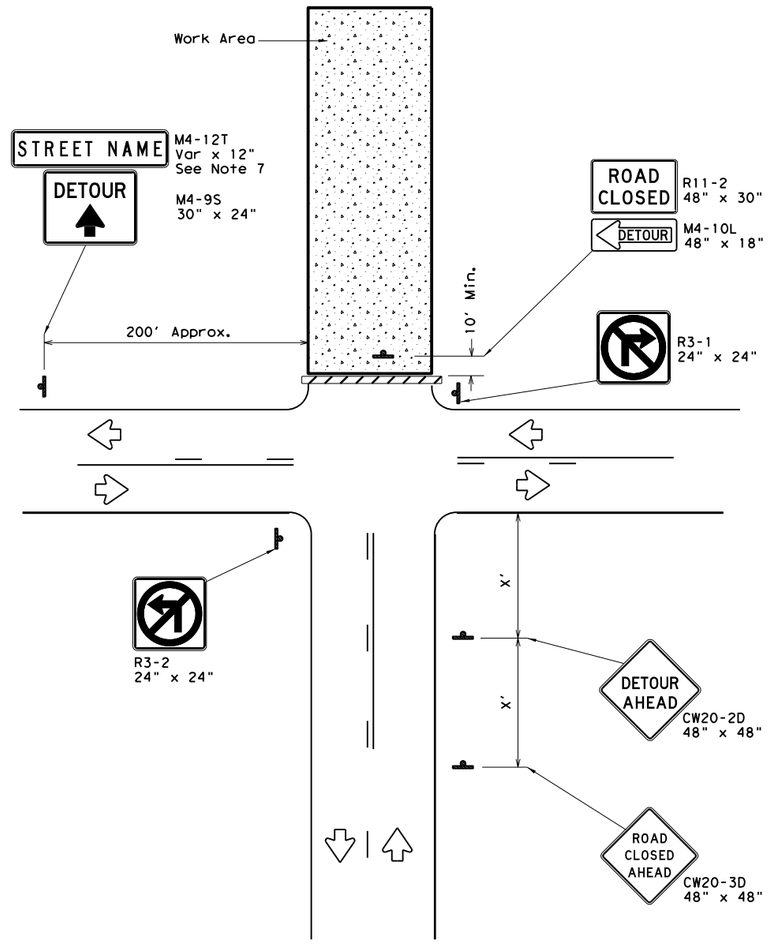
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ROAD CLOSURE BEYOND THE INTERSECTION

Signing for a Numbered Route with an Off-Site Detour



ROAD CLOSURE AT THE INTERSECTION

Signing for an Un-numbered Route with an Off-Site Detour

LEGEND	
	Type 3 Barricade
	Sign

Posted Speed *	Minimum Sign Spacing "X" Distance
30	120'
35	160'
40	240'
45	320'
50	400'
55	500'
60	600'
65	700'
70	800'
75	900'

* Conventional Roads Only

GENERAL NOTES

1. This sheet is intended to provide details for temporary work zone road closures. For permanent road closure details see the D&OM standards.
2. Barricades used shall meet the requirements shown on Barricade and Construction Standard BC(10) and listed on the Compliant Work Zone Traffic Control Devices list (CWZTCD).
3. Stockpiled materials shall not be placed on the traffic side of barricades.
4. Barricades at the road closure should extend from pavement edge to pavement edge.
5. Detour signing shown is intended to illustrate the type of signing that is appropriate for numbered routes or un-numbered routes as labeled. It does not indicate the full extent of detour signing required. Detour routes should be signed as shown elsewhere in the plans.
6. If the road is open for a significant distance beyond the intersection or there are significant origin/destination points beyond the intersection, the signs and barricades at this location should be located at the edge of the traveled way.
7. The Street Name (M4-12T) sign is to be placed above the DETOUR (M4-9S) sign.
8. For urban areas where there is a shorter distance between the intersection and the actual closure location, the ROAD CLOSED XX MILES AHEAD (R11-3a) sign may be replaced with a ROAD CLOSED TO THRU TRAFFIC (R11-4) sign. If adequate space does not exist between the intersection and the closure a single ROAD CLOSED AHEAD (CW20-3D) sign spaced as per the table above may replace the ROAD CLOSED 1000 FT (CW20-3B) and ROAD CLOSED 500 FT (CW20-3C) signs.
9. Signs and barricades shown shall be subsidiary to Item 502. Locations where these details will be required shall be as shown elsewhere in the plans.

Texas Department of Transportation

Traffic Operations Division Standard

WORK ZONE ROAD CLOSURE DETAILS

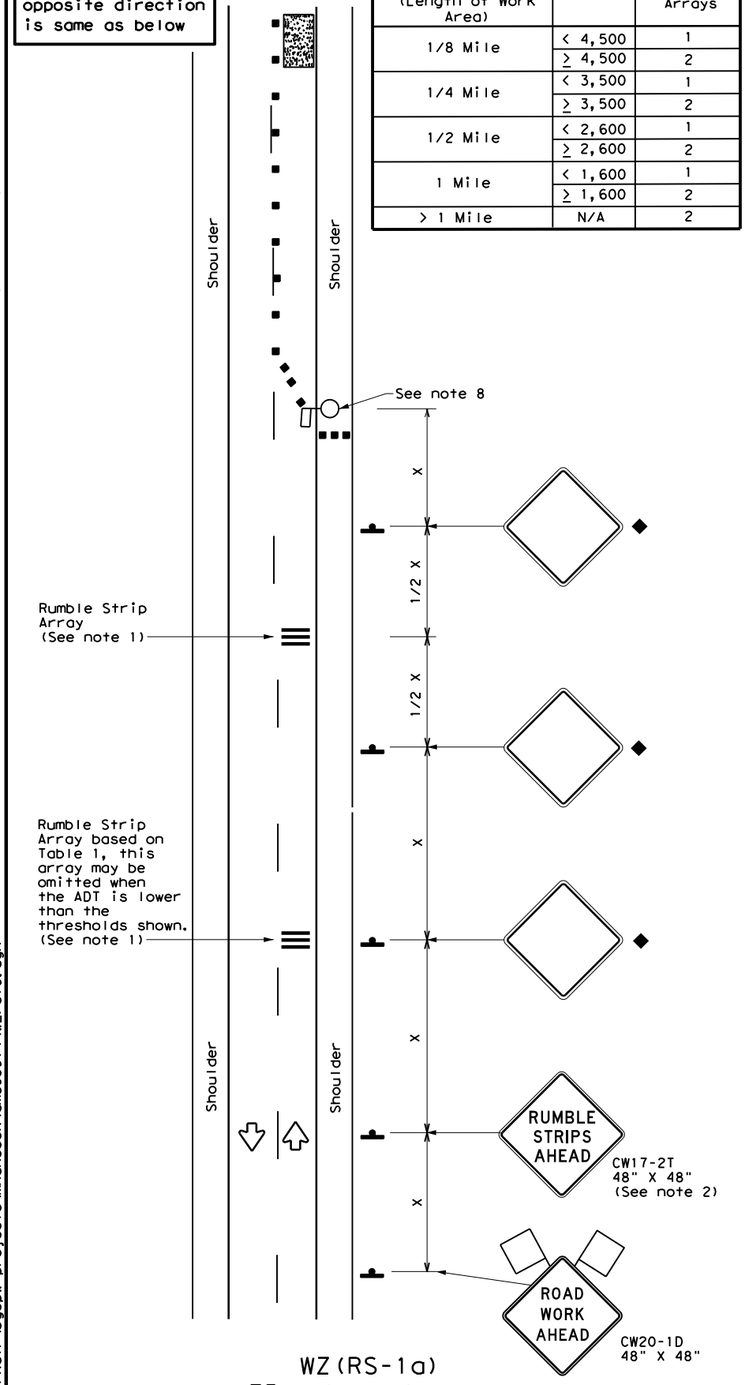
WZ(RCD)-13

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©TxDOT August 1995	CONT	SECT	JOB	HIGHWAY
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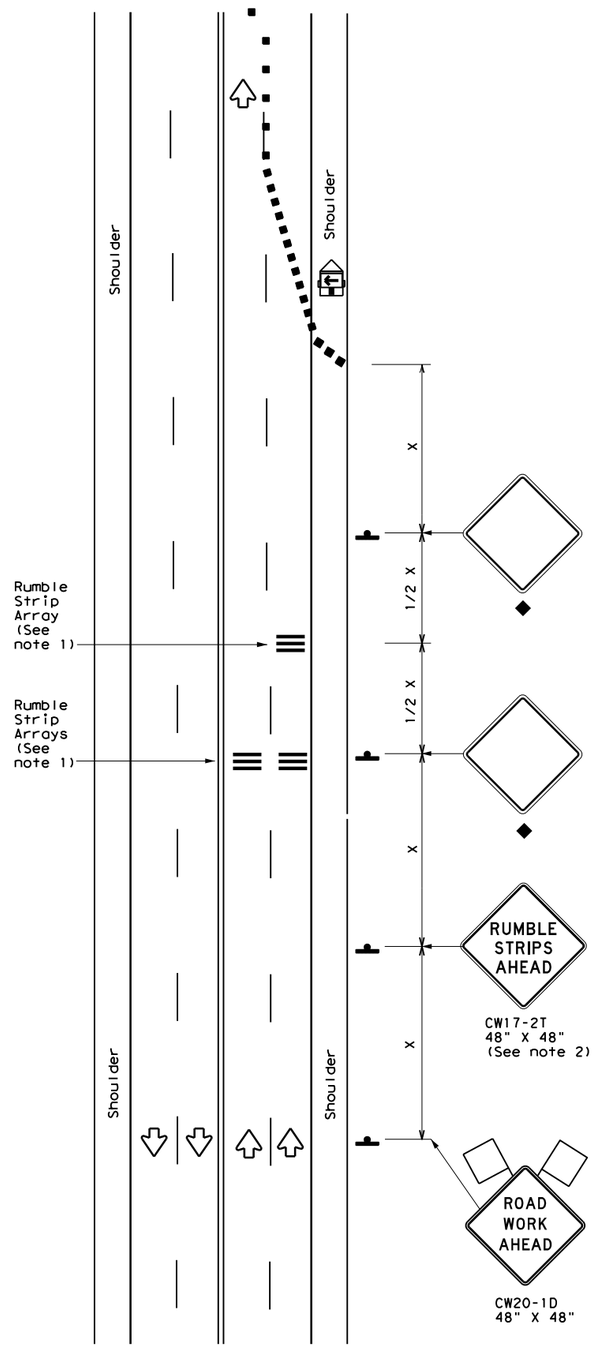
Warning sign and rumble strip sequence in opposite direction is same as below



WZ(RS-1a)
75 mph or Less

RUMBLE STRIPS ON ONE-LANE TWO-WAY APPLICATION

TABLE 1		
Flagger to Flagger (Length of Work Area)	ADT	# of Rumble Strip Arrays
1/8 Mile	< 4,500	1
	≥ 4,500	2
1/4 Mile	< 3,500	1
	≥ 3,500	2
1/2 Mile	< 2,600	1
	≥ 2,600	2
1 Mile	< 1,600	1
	≥ 1,600	2
> 1 Mile	N/A	2



WZ(RS-1b)
75 mph or Less

RUMBLE STRIPS FOR LANE CLOSURE ON CONVENTIONAL ROADWAY

GENERAL NOTES

1. Each Rumble Strip Array should consist of three rumble strips spaced center to center at the spacing shown in Table 2, placed transverse across the lane at locations shown.
2. The CW17-2T "RUMBLE STRIPS AHEAD" sign should be located after the CW20-1D "ROAD WORK AHEAD sign and spaced as shown. If traffic is observed to be queuing, or is expected to queue beyond the Rumble Strips, the CW17-2T sign and the first Rumble Strip Array may be located upstream of the CW20-1D sign as necessary to provide needed warning.
3. Temporary Rumble Strips will be considered subsidiary to Item 502, and shall be a product listed on the Compliant Work Zone Traffic Control Devices.
4. Removal of the Temporary Rumble Strips should be accomplished before removing the advance warning signs.
5. Temporary Rumble Strips should not be used on horizontal curves, loose gravel, soft or bleeding asphalt, heavily rutted pavements or unpaved surfaces.
6. Temporary Rumble Strips shall be installed and maintained as per manufacturer's recommendations.
7. This standard sheet shall be used in conjunction with other appropriate TCP standard, TMUTCD typical application or project specific detail for the project.
8. The one-lane two-way application may utilize a flagger, an AFAD or a portable traffic signal.
9. Temporary Rumble Strips may be used on freeways or expressways based on engineering judgment.

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Panel	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only
** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT)
S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

◆ Signs are for illustrative purposes only. Signs required may vary depending on the TCP, TMUTCD Typical Application, or project specific details for the project.

TABLE 2	
Speed	Approximate distance between strips in an Array
≤ 40 MPH	10'
> 40 MPH & ≤ 55 MPH	15'
> 55 MPH	20'

Texas Department of Transportation
Traffic Operations Division Standard

TEMPORARY RUMBLE STRIPS

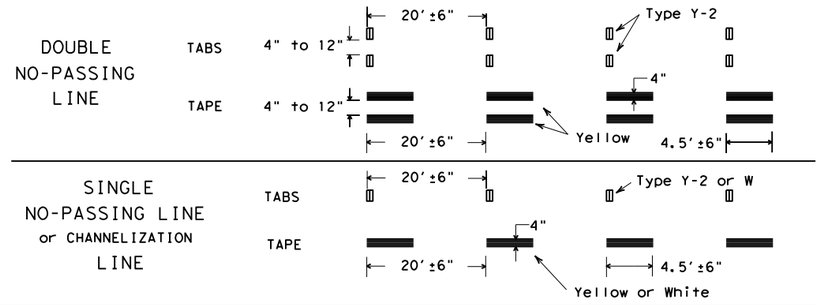
WZ(RS)-16

FILE: wzrs16.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2012	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
2-14	DIST	COUNTY		SHEET NO.
4-16	AUS	HAYS		86

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WORK ZONE SHORT TERM PAVEMENT MARKINGS DETAILS



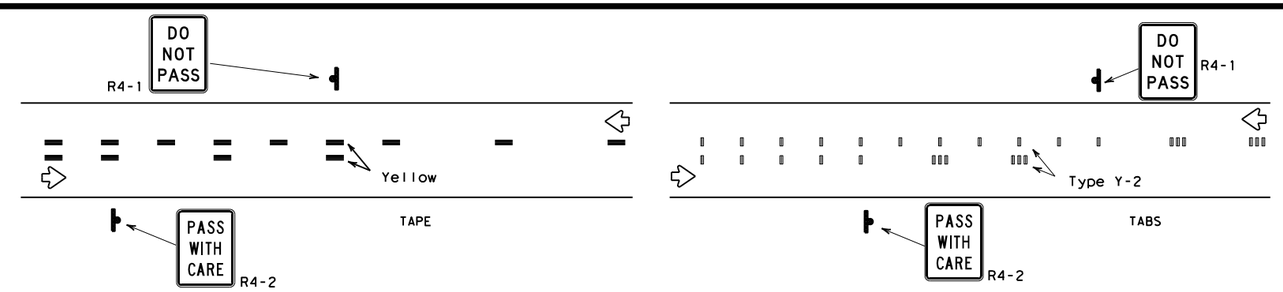
NOTES:

1. Short term pavement markings may be prefabricated markings (stick down tape) or temporary flexible-reflective roadway marker tabs unless otherwise specified elsewhere in plans.
2. Short term pavement markings shall NOT be used to simulate edge lines.
3. Dimensions indicated on this sheet are typical and approximate. Variations in size and height may occur between markers or devices made by manufacturers, by as much as 1/4 inch, unless otherwise noted.
4. Temporary flexible-reflective roadway marker tabs will require normal maintenance replacement when used on roadways with an ADT per lane of up to 7500 vehicles with no more than 10% truck mix. When roadways exceed these values, additional maintenance replacement of devices should be planned.
5. No segment of roadway open to traffic shall remain without permanent pavement markings for a period greater than 14 calendar days. The Contractor will be responsible for maintaining short term pavement markings until permanent pavement markings are in place. When the Contractor is responsible for placement of permanent pavement markings, no segment of roadway shall remain without permanent pavement markings for a period greater than 14 calendar days unless weather conditions prohibit placement. Permanent pavement markings shall be placed as soon as weather permits.
6. For two lane, two-way roadways, DO NOT PASS signs shall be erected to mark the beginning of sections where passing is prohibited and PASS WITH CARE signs shall be erected to mark the beginning of sections where passing is permitted. Signs shall be in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and may be used to indicate the limits of no-passing zones for up to 14 calendar days. Permanent pavement markings should then be placed.
7. For low volume two lane, two-way roadways of 4000 ADT or less, no-passing lines may be omitted when approved by the Engineer. DO NOT PASS and PASS WITH CARE signs shall be erected (see note 6).
8. For exit gores where a lane is being dropped place wide gore markings or retroreflective channelizing devices to guide motorist through the exit. If channelizing devices are to be used it should be noted elsewhere in the plans. One piece cones are not allowed for this purpose.

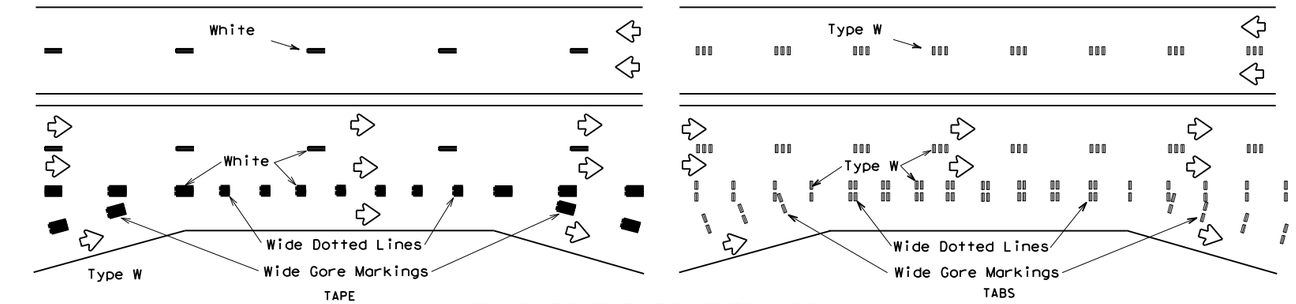
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS (TABS)

1. Temporary flexible-reflective roadway marker tabs detailed on this sheet will be designated Type Y-2 (two amber reflective surfaces with yellow body); Type Y (one amber reflective surface with yellow body); and Type W (one white or silver reflective surface with white body). Additional details may be found on BC(11).
2. Tabs shall meet requirements of Departmental Material Specification DMS-8242.
3. When dry, tabs shall be visible for a minimum distance of 200 feet during normal daylight hours and when illuminated by automobile low-beam head light at night, unless sight distance is restricted by roadway geometrics.
4. No two consecutive tabs nor four tabs per 1000 feet of line shall be missing or fail to meet the visual performance requirements of Note 3.

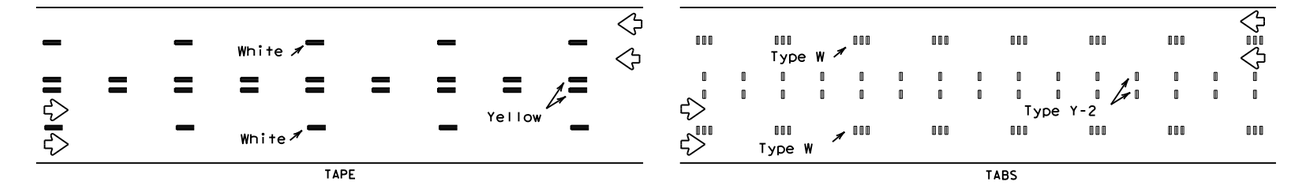
WORK ZONE SHORT TERM PAVEMENT MARKINGS PATTERNS



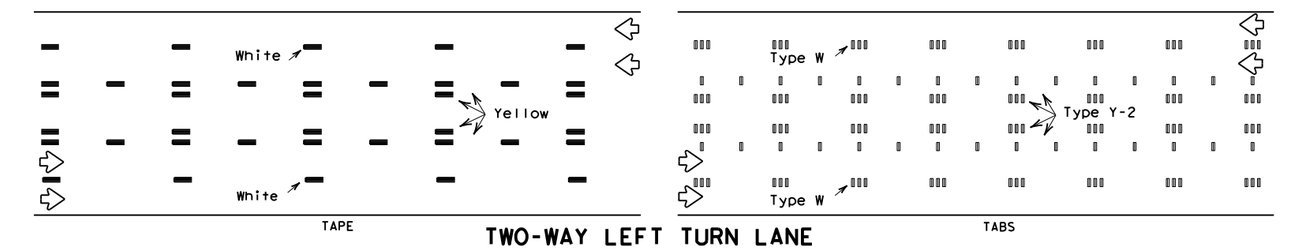
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



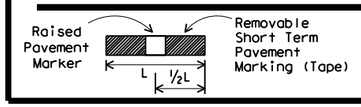
LANE LINES FOR DIVIDED HIGHWAY



LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



TWO-WAY LEFT TURN LANE



If raised pavement markers are used to supplement REMOVABLE short term markings, the markers shall be applied to the top of the tape at the approximate mid length of the tape. This allows an easier removal of raised markers and tape.

PREFABRICATED PAVEMENT MARKINGS

1. Temporary Removable Prefabricated Pavement Markings shall meet the requirements of DMS-8241.
2. Non-removable Prefabricated Pavement Markings shall meet the requirements of either DMS-8240 "Permanent Prefabricated Pavement Markings" or DMS-8243 "Temporary Costruction-Grade Prefabricated Pavement Markings."

RAISED PAVEMENT MARKERS

1. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and DMS-4200.

DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS) & MATERIAL PRODUCER LISTS (MPL)

1. DMSs referenced above can be found along with embedded links to their respective MPLs at the following website:
   http://www.txdot.gov/business/contractors_consultants/material_specifications/default.htm

Texas Department of Transportation

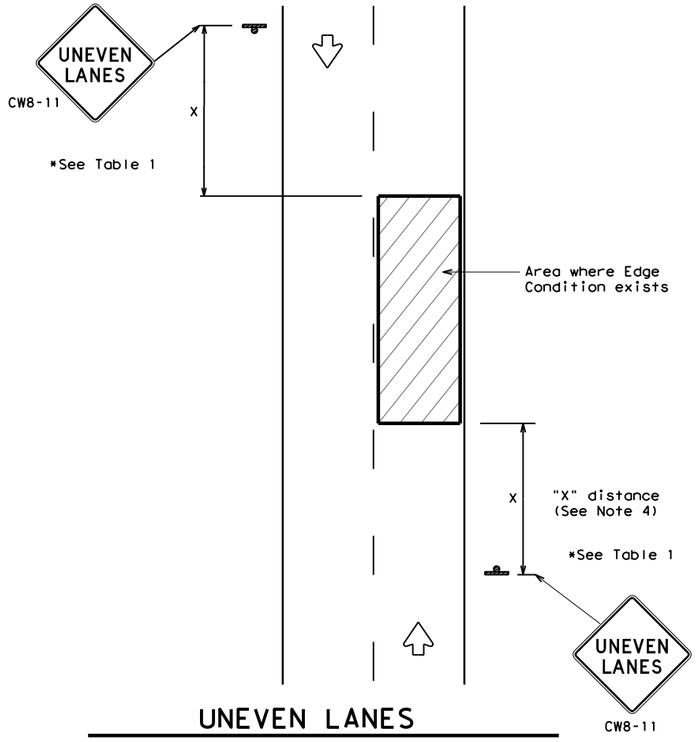
Traffic Operations Division Standard

WORK ZONE SHORT TERM PAVEMENT MARKINGS

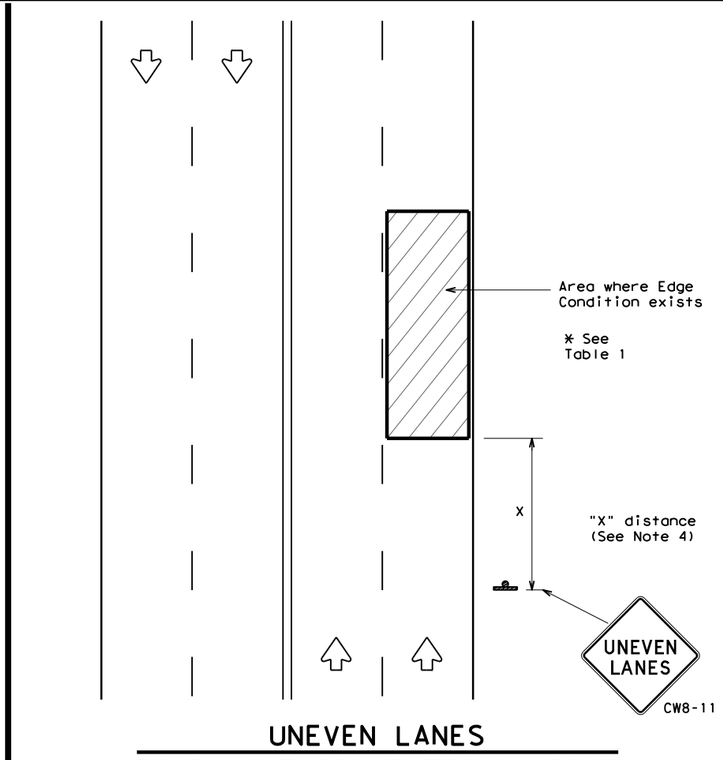
WZ(STPM)-13

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©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
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1-97		DIST	COUNTY		SHEET NO.
3-03		AUS	HAYS		87
7-13					

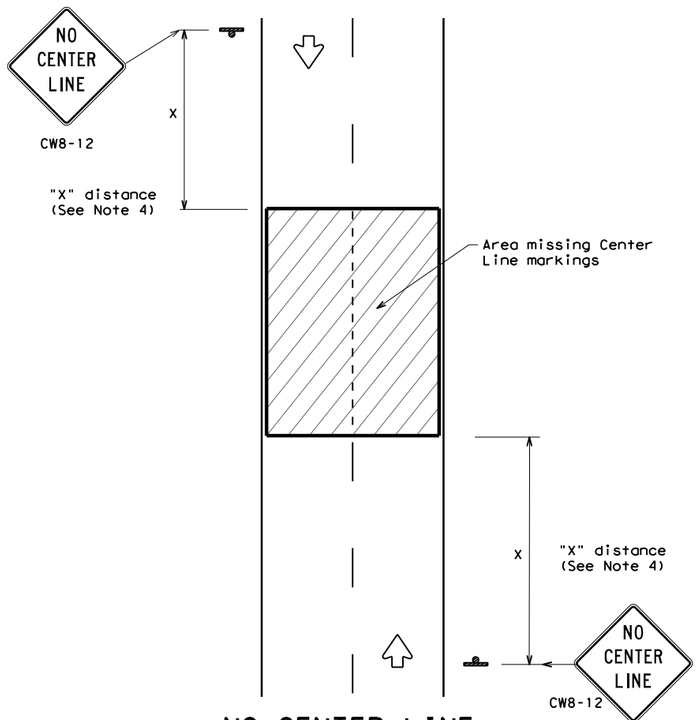
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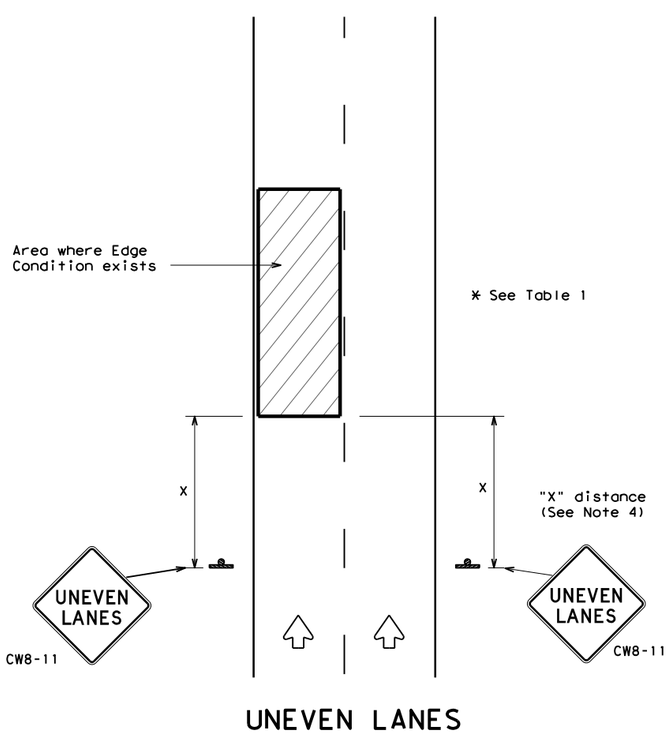
UNEVEN LANES
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
FOUR LANE CONVENTIONAL ROAD



NO CENTER LINE
TWO LANE CONVENTIONAL ROAD



UNEVEN LANES
DIVIDED ROADWAY

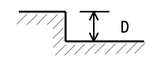
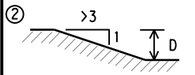
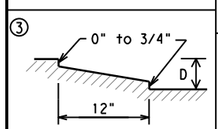
DEPARTMENTAL MATERIAL SPECIFICATIONS	
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY (REMOVABLE) PREFABRICATED PAVEMENT MARKINGS	DMS-8241
SIGN FACE MATERIALS	DMS-8300

COLOR	USAGE	SHEETING MATERIAL
ORANGE	BACKGROUND	TYPE B_{FL} OR TYPE C_{FL} SHEETING
BLACK	LEGEND & BORDERS	ACRYLIC NON-REFLECTIVE SHEETING

GENERAL NOTES

1. If spalling or holes occur, ROUGH ROAD (CW8-8) signs should be placed in advance of the condition and be repeated every two miles where the condition persists.
2. UNEVEN LANES (CW8-11) signs shall be installed in advance of the condition and repeated every mile. Signs installed along the uneven lane condition may be supplemented with the NEXT XX MILES (CW7-3aP) plaque or Advisory Speed (CW13-1P) plaque.
3. NO CENTER LINE (CW8-12) signs and temporary pavement markings as per the WZ(STPM) standard shall be installed if yellow centerlines separating two way traffic are obscured or obliterated. Repeat NO CENTER LINE signs every two miles where the center line markings are not in place. The signs and markings shall remain in place until permanent pavement markings are installed.
4. Signs shall be spaced at the distances recommended as per BC standards.
5. Additional signs may be required as directed by the Engineer. Signs shall remain in place until final surface is applied. Signs shall be considered subsidiary to Item 502 "BARRICADES, SIGNS AND TRAFFIC HANDLING."
6. Signs shall be fabricated and mounted on supports as shown on the BC standards and/or listed on the "Compliant Work Zone Traffic Control Devices" list.
7. Short term markings shall not be used to simulate edge lines.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition.

TABLE 1

Edge Condition	Edge Height (D)	* Warning Devices
① 	Less than or equal to: 1¼" (maximum-planing) 1½" (typical-overlay)	Sign: CW8-11
	Distance "D" may be a maximum of 1 1/4 " for planing operations and 2" for overlay operations if uneven lanes with edge condition 1 are open to traffic after work operations cease.	
② 	Less than or equal to 3"	Sign: CW8-11
③  Notched Wedge Joint	Distance "D" may be a maximum of 3" if uneven lanes with edge condition 2 or 3 are open to traffic after work operations cease. Uneven lanes should not be open to traffic when "D" is greater than 3".	

TRAFFIC CONTROL DURING PLANING, OVERLAY AND LEVELING OPERATIONS ARE SHOWN ELSEWHERE IN THE PLANS.

MINIMUM WARNING SIGN SIZE	
Conventional roads	36" x 36"
Freeways/expressways, divided roadways	48" x 48"

Texas Department of Transportation

Traffic Operations Division Standard

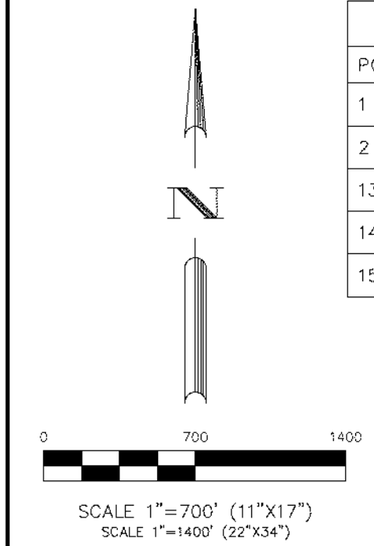
SIGNING FOR UNEVEN LANES

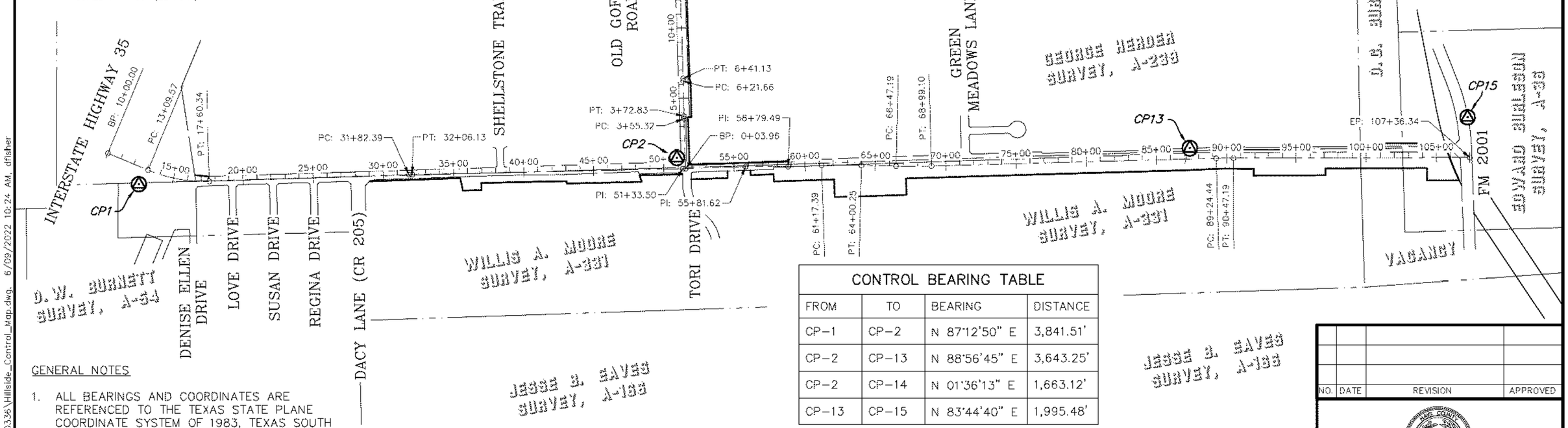
WZ(UL)-13

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©TxDOT	April 1992	CONT	SECT	JOB	HIGHWAY
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8-95 2-98 7-13		DIST	COUNTY		SHEET NO.
1-97 3-03		AUS	HAYS		88

DATE: 1/27/2023 2:02:33 PM
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CONTROL POINT TABLE						
POINT NO.	NORTHING	EASTING	ELEVATION	STATION	OFFSET	DESCRIPTION
1	13,936,003.770	2,337,786.287	728.87'	12+87.52	118.32' RT	MONUMENT STAMPED "TXDOT CONTROL MARK" IN CONC.
2	13,936,190.498	2,341,623.253	744.82'	50+94.27	77.77' LT	MONUMENT STAMPED "TXDOT CONTROL MARK" IN CONC.
13	13,936,257.527	2,345,265.886	792.21'	87+38.47	74.71' LT	1/2" IRON ROD W/"BGE TRAV" CAP
14	13,937,852.968	2,341,669.793	753.77'	17+42.17	39.47' RT	ALUMINUM MONUMENT IN CONC. STAMPED "BGE 14"
15	13,936,474.959	2,347,249.485	698.80'	107+20.88	280.70' LT	1/2" IRON ROD W/"BGE TRAV" CAP IN CONC.





CONTROL BEARING TABLE			
FROM	TO	BEARING	DISTANCE
CP-1	CP-2	N 87°12'50" E	3,841.51'
CP-2	CP-13	N 88°56'45" E	3,643.25'
CP-2	CP-14	N 01°36'13" E	1,663.12'
CP-13	CP-15	N 83°44'40" E	1,995.48'

GENERAL NOTES

1. ALL BEARINGS AND COORDINATES ARE REFERENCED TO THE TEXAS STATE PLANE COORDINATE SYSTEM OF 1983, TEXAS SOUTH CENTRAL ZONE 4204, NAD 83 (2011 ADJ.; EPOCH 2010.00) GEOID 12B, AND NAVD 88. ALL DISTANCES AND COORDINATES ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE TXDOT COUNTYWIDE SURFACE ADJUSTMENT FACTOR OF 1.00013 (HAYS COUNTY).
2. ALL PROJECT CONTROL ELEVATIONS ARE NAVD88 BASED ON GPS OBSERVATIONS USING THE RTKNET VRS SYSTEM. DIGITAL LEVEL LOOPS WERE RUN BETWEEN ALL CONTROL POINTS HOLDING AN ELEVATION OF 744.82 ON CONTROL POINT 2.
3. ALL MEASUREMENTS ARE IN U.S. SURVEY FEET.
4. LAT/LONG GENERATED FROM GRID COORDINATES.

POINT TABLE (GRID/GEODETIC)				
POINT NO.	NORTHING	EASTING	LATITUDE	LONGITUDE
1	13,934,192.325	2,337,482.414	N30°03'29.82"	W97°50'01.01"
2	13,934,379.029	2,341,318.881	N30°03'31.29"	W97°49'17.34"
13	13,934,446.049	2,344,961.041	N30°03'31.59"	W97°48'35.88"
14	13,936,041.283	2,341,365.415	N30°03'47.74"	W97°49'16.62"
15	13,934,663.453	2,346,944.383	N30°03'33.54"	W97°48'13.29"

PRELIMINARY PENDING FINAL REVIEW

DAMIAN G. FISHER RPLS NO. 6928
BGE, INC.
101 WEST LOUIS HENNA BLVD., SUITE 400
AUSTIN, TEXAS 78728
TELEPHONE: (512) 879-0400

NO.	DATE	REVISION	APPROVED

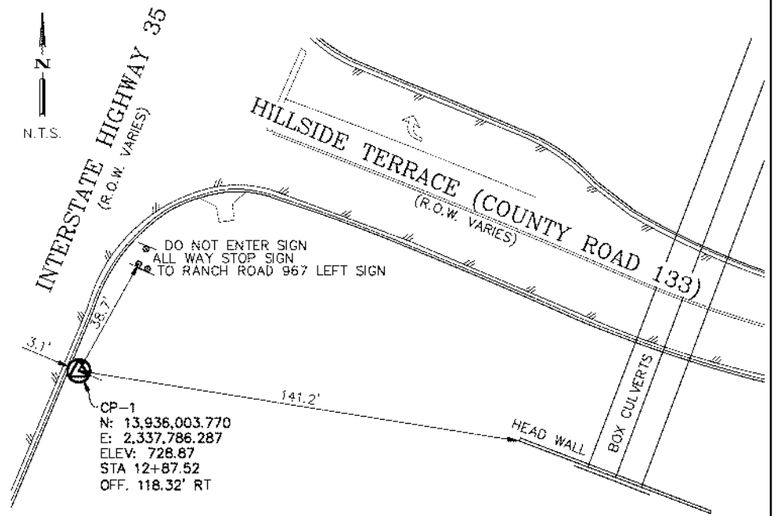
BGE, Inc.
101 W. Louis Henna Blvd., Suite 400. Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

CONTROL INDEX MAP

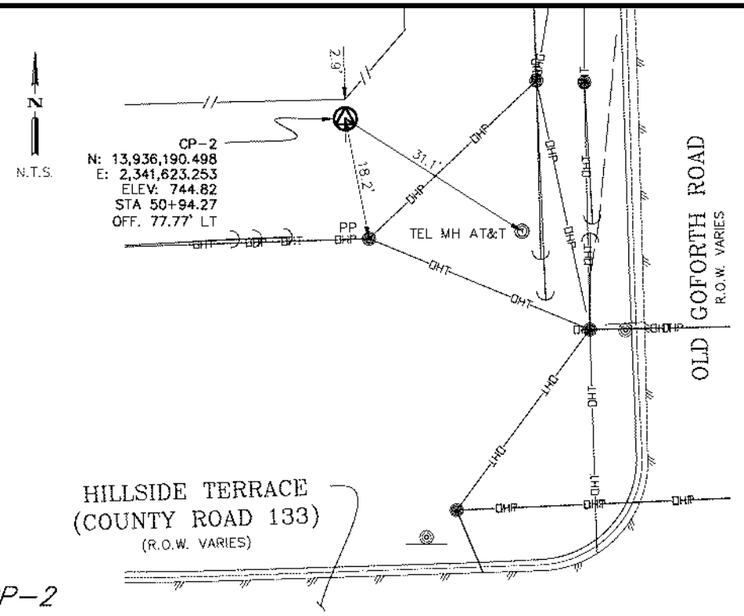
DESIGNED BY:	DGF	SHEET 1 OF 2
DRAWN BY:	DGF	89
CHECKED BY:	DGF	
APPROVED BY:		

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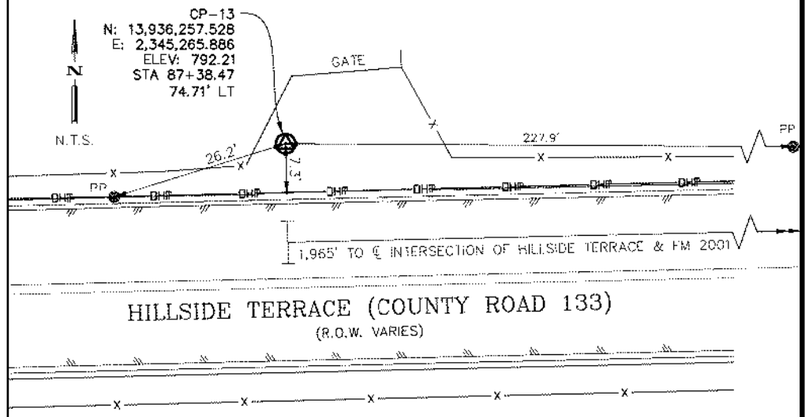
CP-1

SET 5/8-INCH IRON ROD WITH ALUMINUM CAP STAMPED "TXDOT CONTROL MARK" SET IN CONCRETE AT THE SOUTHEAST CORNER OF THE INTERSECTION OF THE NORTHBOUND FRONTAGE ROAD OF INTERSTATE HIGHWAY 35 AND HILLSIDE TERRACE (COUNTY ROAD 133), BEING 3.1 FEET EAST OF THE BACK OF CURB, 38.7 FEET SOUTH OF AM ALL WAY STOP SIGN, AND 141.2 FEET WEST OF THE CORNER OF A HEADWALL OF A BOX CULVERT.
(ESTABLISHED 02/12/2019)



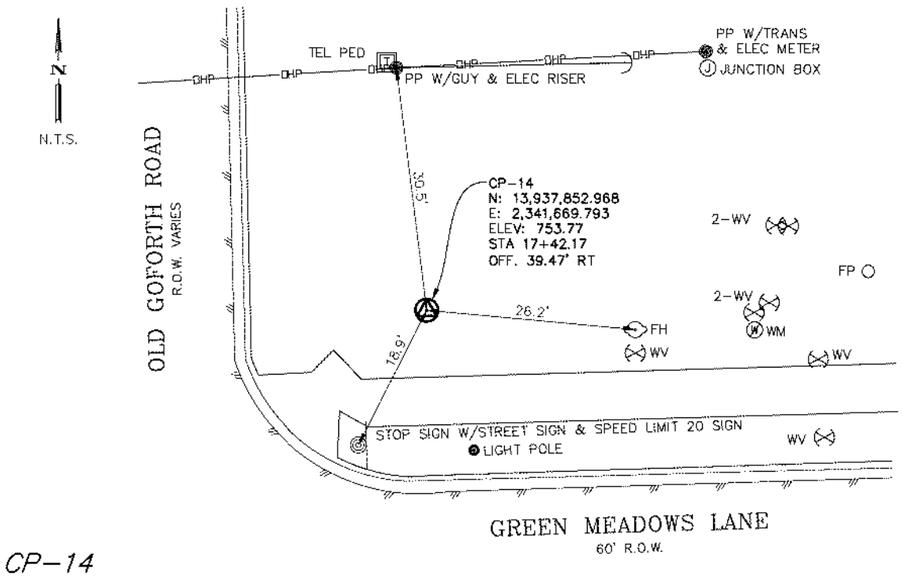
CP-2

SET 5/8-INCH IRON ROD WITH ALUMINUM CAP STAMPED "TXDOT CONTROL MARK" SET IN CONCRETE AT THE NORTHWEST CORNER OF THE INTERSECTION OF OLD GOFORTH ROAD AND HILLSIDE TERRACE (COUNTY ROAD 133), BEING 2.9 FEET SOUTH OF A WOODEN FENCE CORNER, 18.2 FEET NORTH OF A POWER POLE, AND 31.1 FEET NORTHWEST OF AN AT&T TELEPHONE MANHOLE.
(ESTABLISHED 02/12/2019)



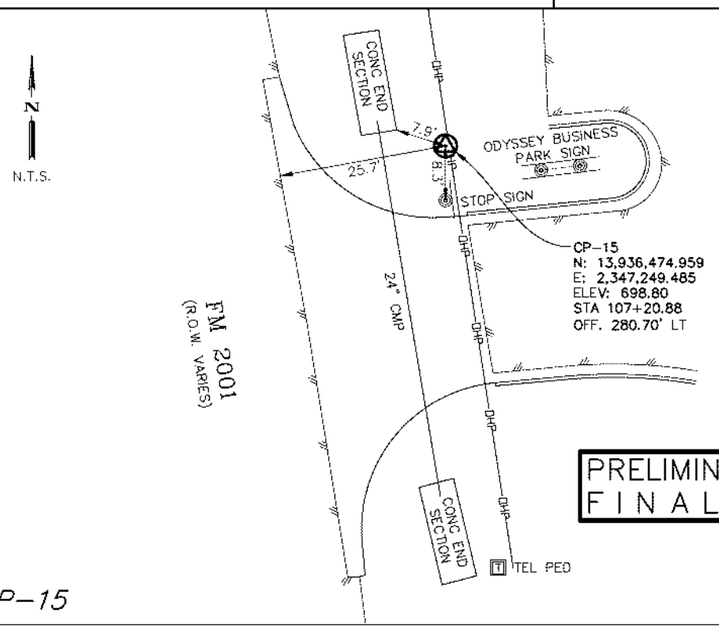
CP-13

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" SET ON THE NORTH SIDE OF HILLSIDE TERRACE (COUNTY ROAD 133), APPROXIMATE 1,965 FEET WEST OF THE INTERSECTION OF THE CENTERLINES OF HILLSIDE TERRACE AND F.M. 2001, BEING 7.3 FEET NORTH OF THE BACK OF CURB, 26.2 FEET NORTHEAST OF A POWER POLE AND 227.9 FEET WEST OF A POWER POLE.
(ESTABLISHED 09/18/2019)



CP-14

SET 1/2-INCH IRON ROD WITH ALUMINUM CAP STAMPED "BGE 14" SET IN CONCRETE AT THE NORTHEAST CORNER OF THE INTERSECTION OF OLD GOFORTH ROAD AND GREEN MEADOWS LANE, BEING 18.9 FEET NORTHEAST OF A STOP SIGN W/STREET SIGN AND SPEED LIMIT 20 SIGN, 26.2 FEET WEST OF A FIRE HYDRANT AND 30.5 FEET SOUTH OF A POWER POLE W/GUY AND ELECTRIC RISER.
(ESTABLISHED 01/04/2021)



CP-15

SET 1/2-INCH IRON ROD WITH PLASTIC CAP STAMPED "BGE TRAV" SET IN CONCRETE ON THE EAST SIDE OF FM 2001, APPROXIMATE 224 FEET NORTH OF THE INTERSECTION OF THE CENTERLINES OF HILLSIDE TERRACE AND F.M. 2001, ON THE NORTH SIDE OF THE ENTRANCE TO THE ODYSSEY BUSINESS PARK, BEING 8.3 FEET NORTH OF A STOP SIGN, 7.9 FEET SOUTHEAST OF THE SOUTHEAST CORNER OF A CONCRETE MITERED END TREATMENT AND 25.7' EAST OF THE EDGE OF ASPHALT.
(ESTABLISHED 01/04/2021)

PRELIMINARY PENDING FINAL REVIEW

LEGEND

N.T.S.	NOT TO SCALE
	CONTROL POINT
	TELEPHONE MANHOLE
	POWER POLE
	SIGN
	GUY ANCHOR
	EDGE OF ASPHALT
-OHP-	OVERHEAD POWER
-x-	BARBED WIRE FENCE
-//-	WOODEN FENCE

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1045

HILLSIDE TERRACE

CONTROL SKETCHES

DESIGNED BY:	DGF	SHEET 2 OF 2
DRAWN BY:	DGF	90
CHECKED BY:	DGF	
APPROVED BY:		

HORIZONTAL ALIGNMENT DATA

HILLSIDE TERRACE

```
*        1   DESCRIBE CHAIN HST CL

Chain HST CL contains:
 70 CUR HST CL-11 CUR HST CL-12 71 74 75 CUR HST CL-13 CUR HST CL-14 CUR HST CL-15 73

Beginning chain HST CL description
================================================================================

Point 70              X     2,337,566.62 Y    13,936,223.81 Sta      10+00.00

Course from 70 to PC HST CL-11 S 67  19' 07.32" E Dist 309.57

                                    Curve Data
                                   *----------*
Curve HST CL-11
P.I.  Station              15+38.49  X        2,338,063.47  Y       13,936,016.17
Delta        =      24  35' 50.57" (LT)
Degree       =       5  27' 24.27"
Tangent      =                228.91
Length       =                450.77
Radius       =             1,050.00
External     =                 24.66
Long Chord   =                447.32
Mid. Ord.    =                 24.10
P.C.  Station              13+09.57  X        2,337,852.26  Y       13,936,104.44
P.T.  Station              17+60.34  X        2,338,292.25  Y       13,936,023.82
C.C.                                 X        2,338,257.14  Y       13,937,073.24
Back         = S  67  19' 07.32" E
Ahead        = N  88  05' 02.10" E
Chord Bear   = S  79  37' 02.61" E

Course from PT HST CL-11 to PC HST CL-12 N 88  05' 02.10" E Dist 1,422.04

                                    Curve Data
                                   *----------*
Curve HST CL-12
P.I.  Station              31+94.26  X        2,339,725.37  Y       13,936,071.77
Delta        =       0  40' 49.14" (RT)
Degree       =       2  51' 53.24"
Tangent      =                 11.87
Length       =                 23.75
Radius       =             2,000.00
External     =                  0.04
Long Chord   =                 23.75
Mid. Ord.    =                  0.04
P.C.  Station              31+82.39  X        2,339,713.50  Y       13,936,071.37
P.T.  Station              32+06.13  X        2,339,737.24  Y       13,936,072.02
C.C.                                 X        2,339,780.37  Y       13,934,072.49
Back         = N  88  05' 02.10" E
Ahead        = N  88  45' 51.25" E
Chord Bear   = N  88  25' 26.68" E

Course from PT HST CL-12 to 71 N 88  45' 51.25" E Dist 1,927.36

Point 71              X     2,341,664.15 Y    13,936,113.59 Sta      51+33.50

Course from 71 to 74 N 88  05' 03.77" E Dist 448.12

Point 74              X     2,342,112.02 Y    13,936,128.57 Sta      55+81.62

Course from 74 to 75 S 89  59' 30.34" E Dist 297.87

Point 75              X     2,342,409.90 Y    13,936,128.53 Sta      58+79.49

Course from 75 to PC HST CL-13 N 88  05' 03.77" E Dist 237.90
```

HILLSIDE TERRACE CONT.

```
                                    Curve Data
                                   *----------*
Curve HST CL-13
P.I.  Station              62+58.86  X        2,342,789.05  Y       13,936,141.21
Delta        =       3  14' 28.76" (RT)
Degree       =       1  08' 45.30"
Tangent      =                141.47
Length       =                282.86
Radius       =             5,000.00
External     =                  2.00
Long Chord   =                282.82
Mid. Ord.    =                  2.00
P.C.  Station              61+17.39  X        2,342,647.66  Y       13,936,136.48
P.T.  Station              64+00.25  X        2,342,930.48  Y       13,936,137.93
C.C.                                 X        2,342,814.80  Y       13,931,139.27
Back         = N  88  05' 03.77" E
Ahead        = S  88  40' 27.48" E
Chord Bear   = N  89  42' 18.15" E

Course from PT HST CL-13 to PC HST CL-14 S 88  40' 27.48" E Dist 246.94

                                    Curve Data
                                   *----------*
Curve HST CL-14
P.I.  Station              67+73.17  X        2,343,303.30  Y       13,936,129.31
Delta        =       2  53' 12.13" (LT)
Degree       =       1  08' 45.30"
Tangent      =                125.98
Length       =                251.91
Radius       =             5,000.00
External     =                  1.59
Long Chord   =                251.89
Mid. Ord.    =                  1.59
P.C.  Station              66+47.19  X        2,343,177.35  Y       13,936,132.22
P.T.  Station              68+99.10  X        2,343,429.24  Y       13,936,132.74
C.C.                                 X        2,343,293.03  Y       13,941,130.88
Back         = S  88  40' 27.48" E
Ahead        = N  88  26' 20.39" E
Chord Bear   = N  89  52' 56.45" E

Course from PT HST CL-14 to PC HST CL-15 N 88  26' 20.39" E Dist 2,025.34

                                    Curve Data
                                   *----------*
Curve HST CL-15
P.I.  Station              89+85.82  X        2,345,515.18  Y       13,936,189.58
Delta        =       1  24' 23.59" (RT)
Degree       =       1  08' 45.30"
Tangent      =                 61.38
Length       =                122.74
Radius       =             5,000.00
External     =                  0.38
Long Chord   =                122.74
Mid. Ord.    =                  0.38
P.C.  Station              89+24.44  X        2,345,453.82  Y       13,936,187.91
P.T.  Station              90+47.19  X        2,345,576.55  Y       13,936,189.75
C.C.                                 X        2,345,590.03  Y       13,931,189.77
Back         = N  88  26' 20.39" E
Ahead        = N  89  50' 43.98" E
Chord Bear   = N  89  08' 32.19" E

Course from PT HST CL-15 to 73 N 89  50' 43.98" E Dist 1,689.15

Point 73              X     2,347,265.70 Y    13,936,194.30 Sta     107+36.34

================================================================================
Ending chain HST CL description
```

PRELIMINARY
SUBMITTED FOR INTERIM REVIEW Under the authority of: JOHN W. TULEY, PE No 102441 DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

HORIZONTAL
ALIGNMENT DATA

DESIGNED BY:		SHEET 1 OF 2
DRAWN BY:		91
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:02:51 PM pdf.pltcfg
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HORIZONTAL ALIGNMENT DATA

OLD GOFORTH RD

```
*        1   DESCRIBE CHAIN GF CL

Chain GF CL contains:
 GF20 CUR GF CL20 CUR GF CL21 GF21

Beginning chain GF CL description
================================================================================

Point GF20            X     2,341,685.01 Y    13,936,114.28 Sta       0+03.96

Course from GF20 to PC GF CL20 N 1° 52′ 53.14" W Dist 351.36

                                  Curve Data
                                 *----------*
Curve GF CL20
P.I.  Station              3+64.08  X        2,341,673.19  Y       13,936,474.21
Delta        =       0° 57′ 55.20" (RT)
Degree       =       5° 30′ 52.24"
Tangent      =                8.75
Length       =               17.51
Radius       =           1,039.00
External     =                0.04
Long Chord   =               17.51
Mid. Ord.    =                0.04
P.C.  Station              3+55.32  X        2,341,673.48  Y       13,936,465.46
P.T.  Station              3+72.83  X        2,341,673.05  Y       13,936,482.96
C.C.                                X        2,342,711.92  Y       13,936,499.57
Back         = N   1° 52′ 53.14" W
Ahead        = N   0° 54′ 57.94" W
Chord Bear   = N   1° 23′ 55.54" W

Course from PT GF CL20 to PC GF CL21 N 0° 54′ 57.94" W Dist 248.83

                                  Curve Data
                                 *----------*
Curve GF CL21
P.I.  Station              6+31.40  X        2,341,668.91  Y       13,936,741.49
Delta        =       1° 04′ 24.82" (LT)
Degree       =       5° 30′ 52.24"
Tangent      =                9.73
Length       =               19.47
Radius       =           1,039.00
External     =                0.05
Long Chord   =               19.47
Mid. Ord.    =                0.05
P.C.  Station              6+21.66  X        2,341,669.07  Y       13,936,731.76
P.T.  Station              6+41.13  X        2,341,668.58  Y       13,936,751.22
C.C.                                X        2,340,630.20  Y       13,936,715.15
Back         = N   0° 54′ 57.94" W
Ahead        = N   1° 59′ 22.76" W
Chord Bear   = N   1° 27′ 10.35" W

Course from PT GF CL21 to GF21 N 1° 59′ 22.76" W Dist 1,358.77

Point GF21            X     2,341,621.40 Y    13,938,109.17 Sta      19+99.90

================================================================================
Ending chain GF CL description
```

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1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY
STATE OF TEXAS

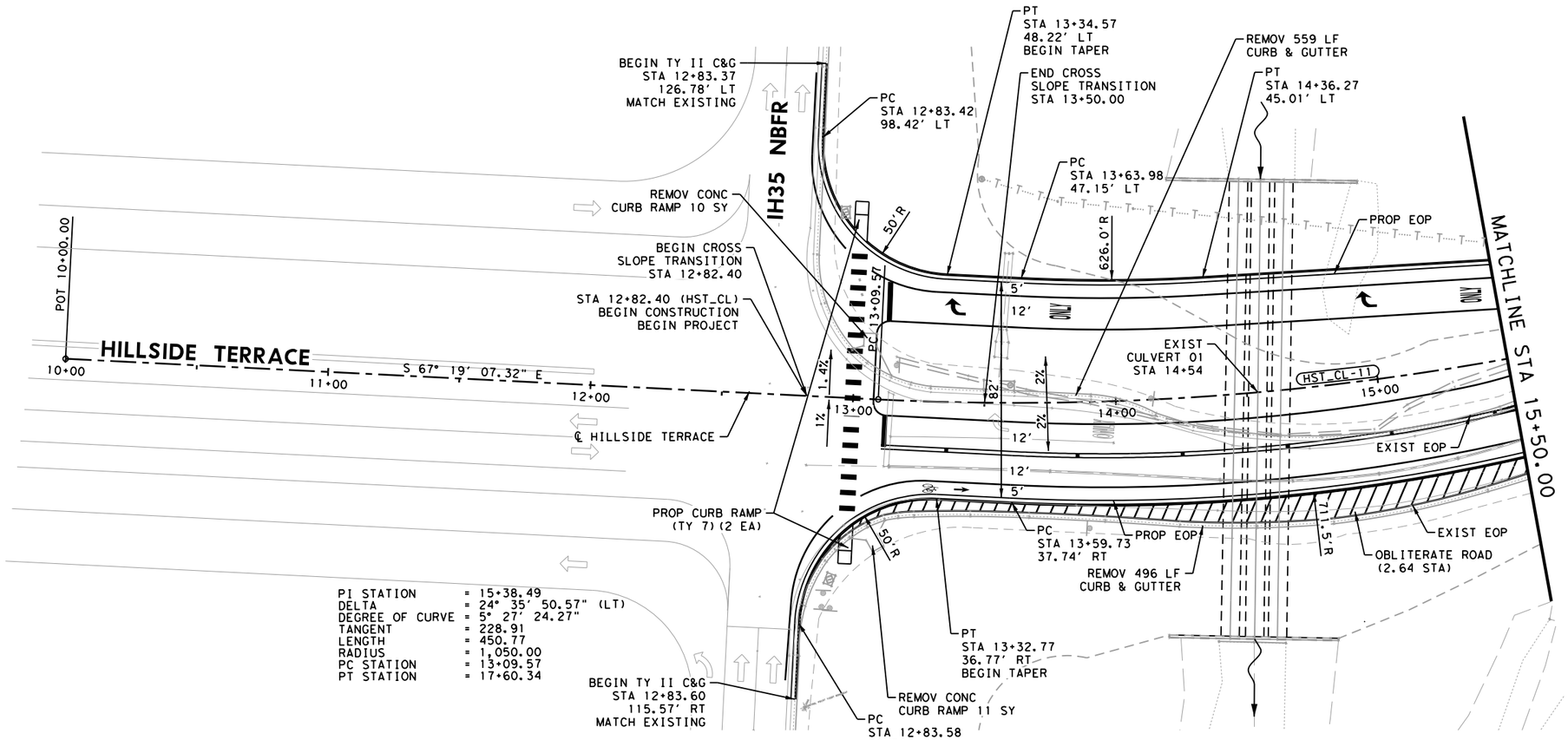
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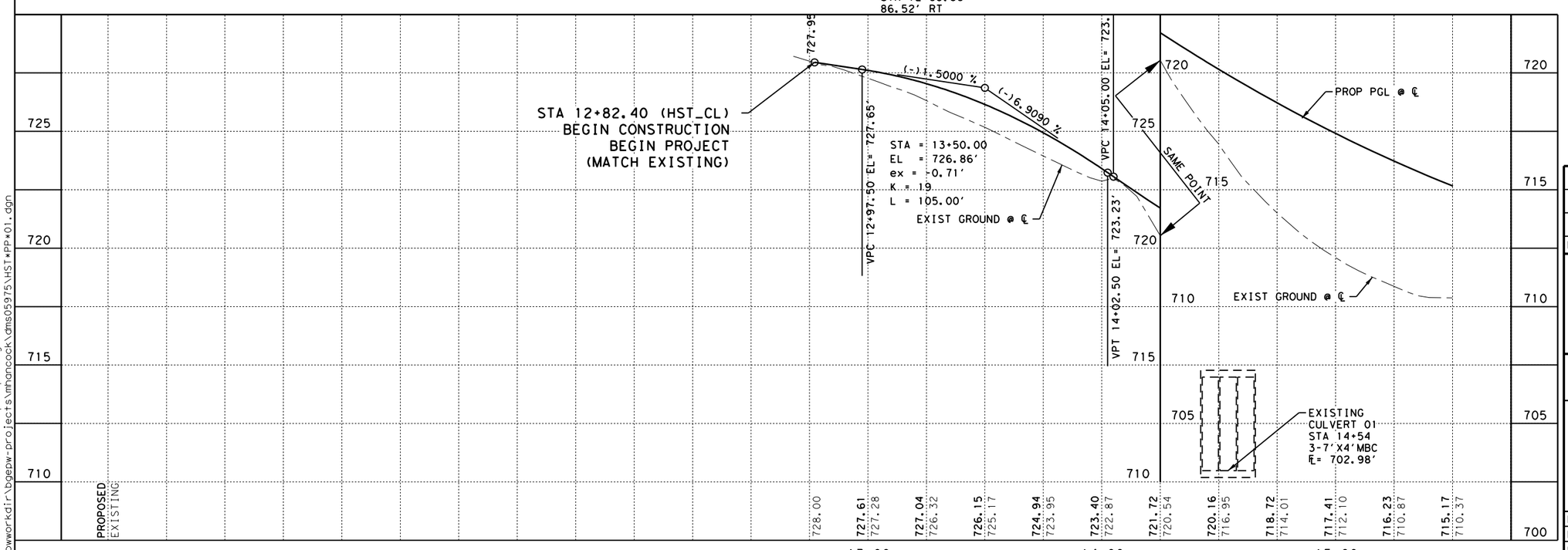
HILLSIDE TERRACE

HORIZONTAL
ALIGNMENT DATA

DESIGNED BY:		SHEET 2 OF 2
DRAWN BY:		
CHECKED BY:		92
APPROVED BY:		

1/27/2023 2:02:57 PM pdf.pltcfg
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

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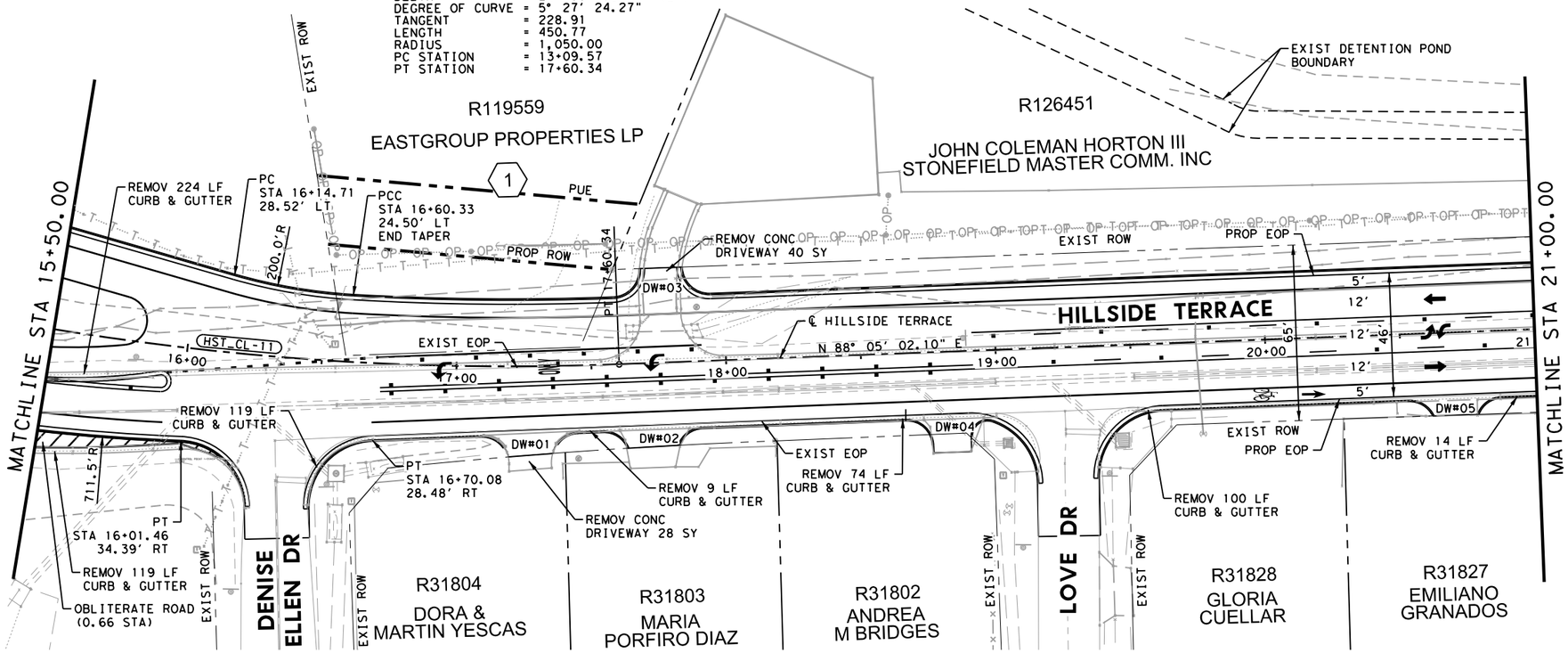
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 1 OF 22
DRAWN BY:		93
CHECKED BY:		
APPROVED BY:		

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PI STATION = 15+38.49
DELTA = 24° 35' 50.57" (LT)
DEGREE OF CURVE = 5° 27' 24.27"
TANGENT = 228.91
LENGTH = 450.77
RADIUS = 1,050.00
PC STATION = 13+09.57
PT STATION = 17+60.34



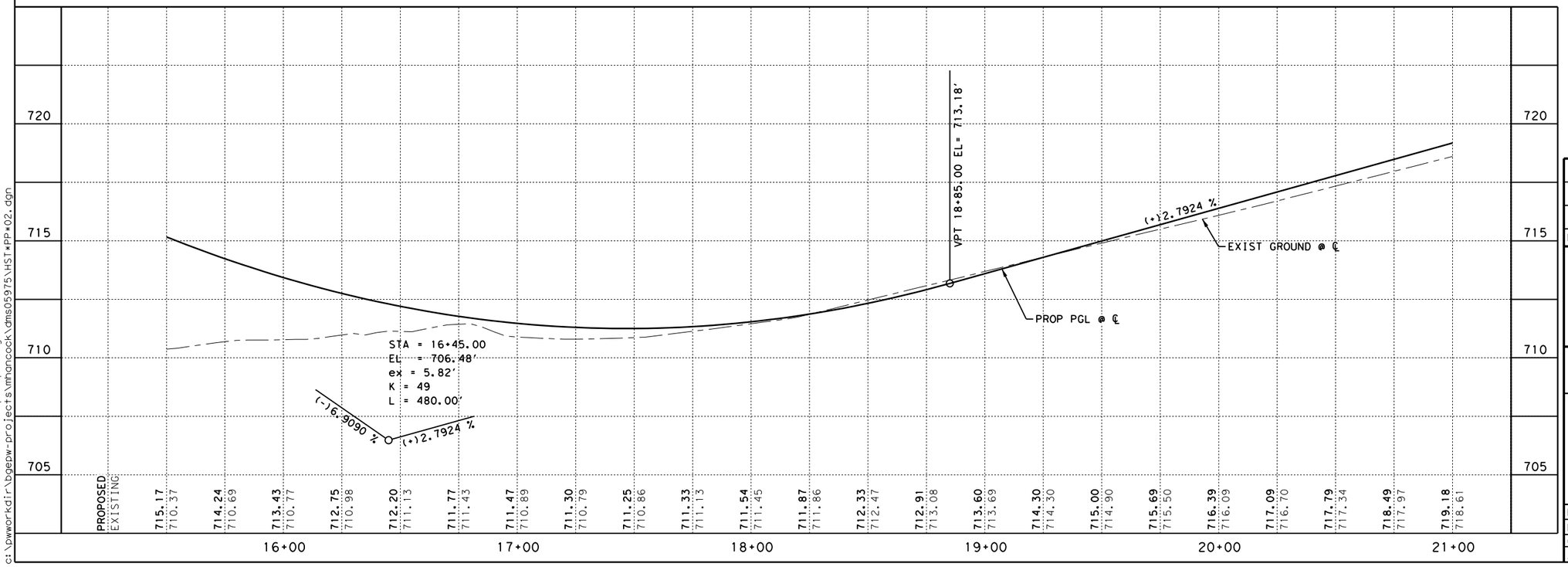
N

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V



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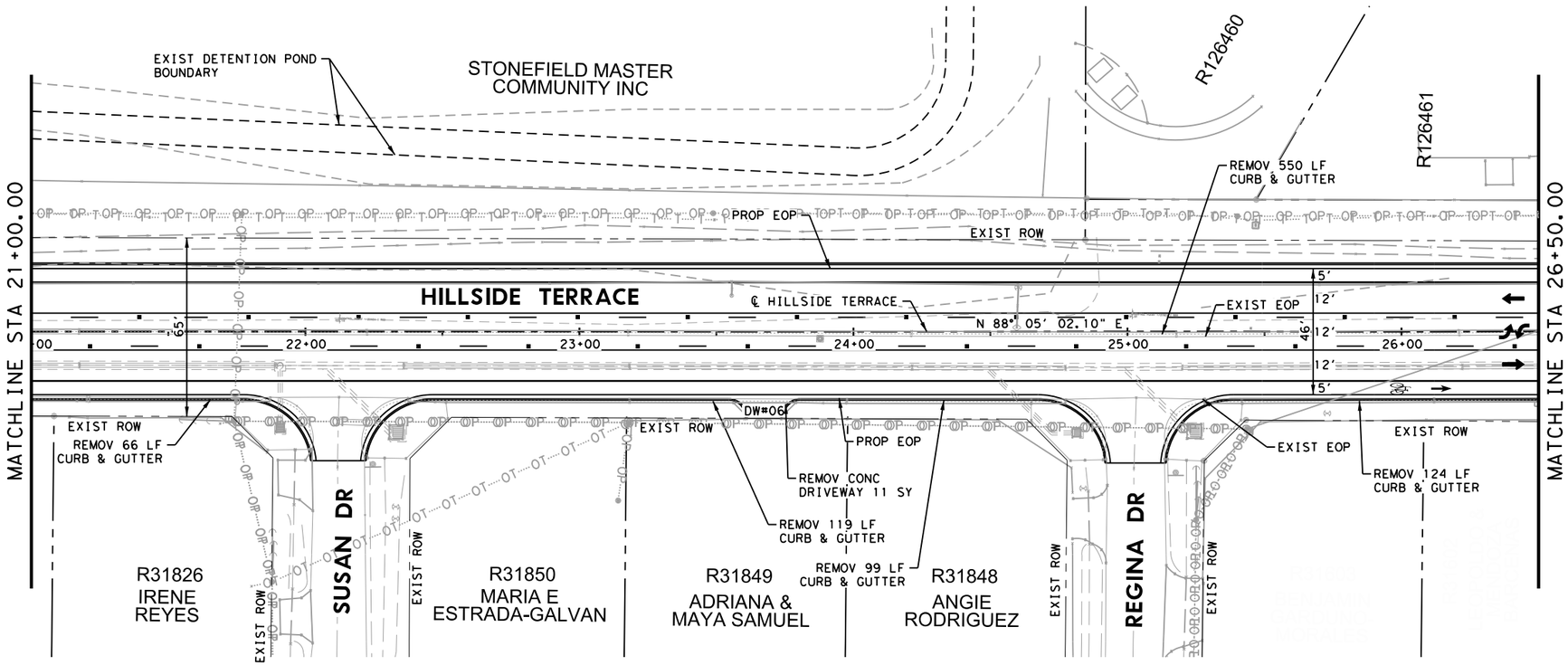
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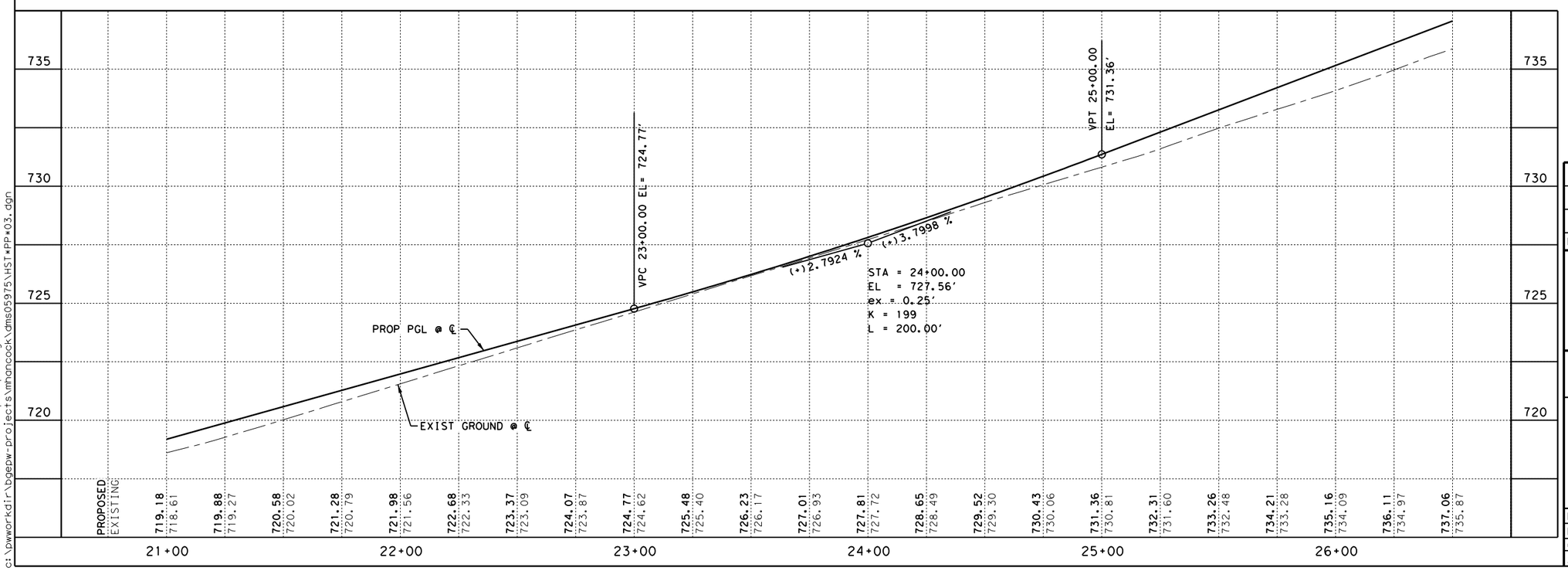
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 2 OF 22
DRAWN BY:		94
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:03:08 PM pdf.pltcfg
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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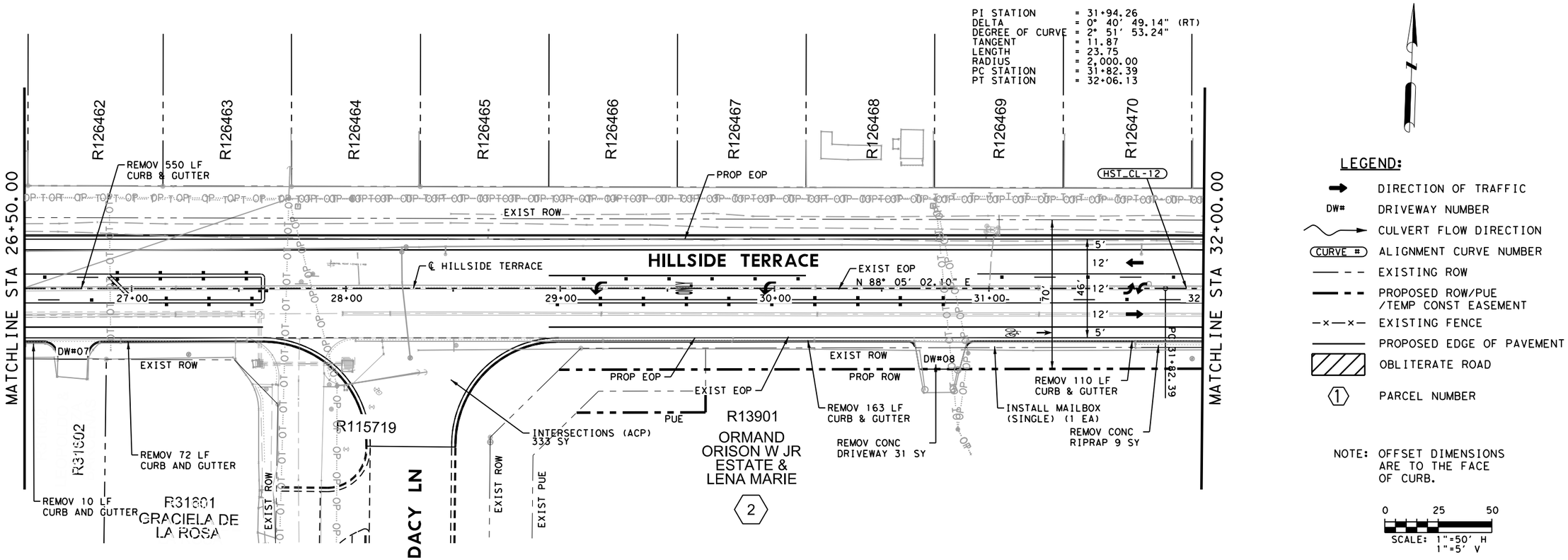
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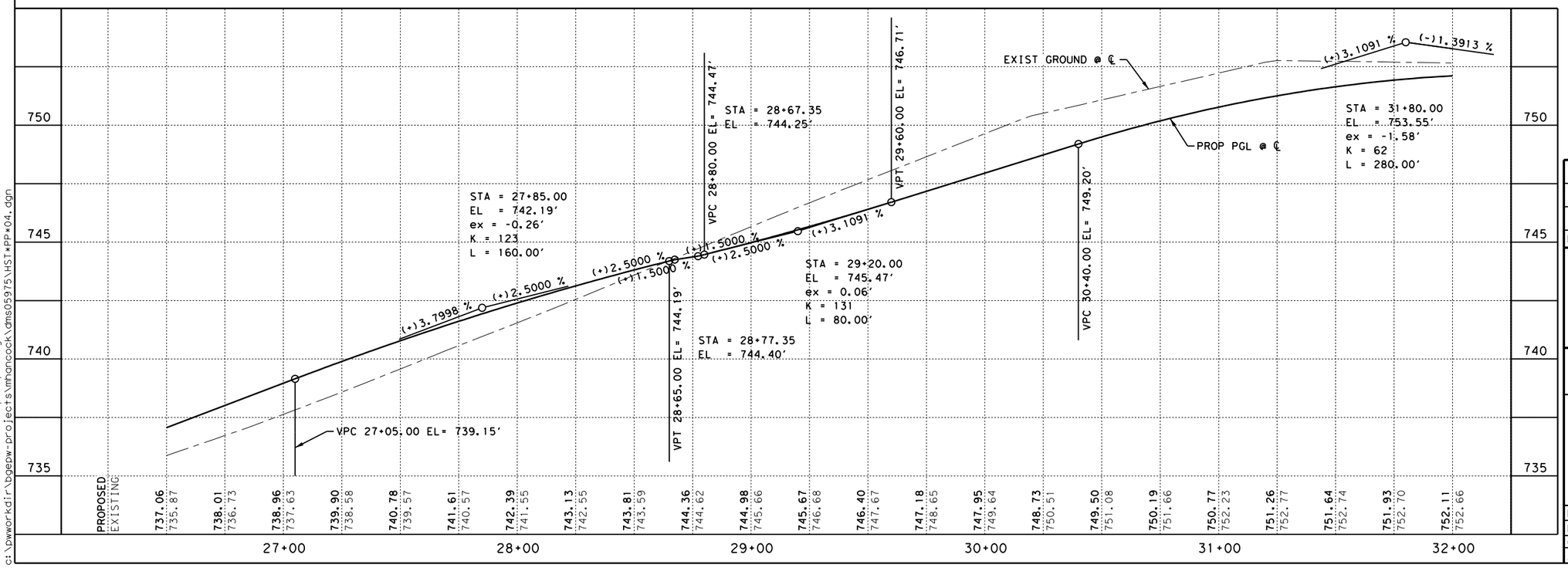
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 3 OF 22
DRAWN BY:		
CHECKED BY:		95
APPROVED BY:		

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HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 4 OF 22
DRAWN BY:		
CHECKED BY:		96
APPROVED BY:		

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PI STATION = 31+94.26
DELTA = 0° 40' 49.14" (RT)
DEGREE OF CURVE = 2° 51' 53.24"
TANGENT = 11.87
LENGTH = 23.75
RADIUS = 2,000.00
PC STATION = 31+82.39
PT STATION = 32+06.13

MATCHLINE STA 32+00.00

MATCHLINE STA 37+50.00

R126471 R126472 R126473 R126474 R126475 R126476 R126477 R126478 R126479

HST_CL-12

REMOV 550 LF CURB & GUTTER

PROP EOP

REMOV CONC RIPRAP 33 SY

EXIST ROW

℄ HILLSIDE TERRACE

HILLSIDE TERRACE

N 88° 45' 51.25" E

33+00 34+00 35+00 36+00 37+00

69'

46'

5' 12' 12' 12' 5'

EXIST EOP

REMOV TAS (1 EA)

REMOV SGT (1 EA)

REMOV CONC RIPRAP 35 SY

RIPRAP (CONC) (4 IN) (2 CY)

BEGIN SAWTOOTH CURB STA 35+46.00 (SEE MISCELLANEOUS DETAILS)

REMOV MBGF (103 LF)

CULVERT 02 STA 35+59

END SAWTOOTH CURB STA 35+66.00 (SEE MISCELLANEOUS DETAILS)

BEGIN SAWTOOTH CURB STA 36+45.00 (SEE MISCELLANEOUS DETAILS)

RIPRAP (CONC) (4 IN) (2 CY)

END SAWTOOTH CURB STA 36+65.00 (SEE MISCELLANEOUS DETAILS)

PI 32+06.13

DW#09

EXIST ROW

REMOV CONC DRIVEWAY 23 SY

REMOV CONC RIPRAP 5 SY

REMOV 17 LF CURB & GUTTER

PROP EOP

REMOV 265 LF CURB & GUTTER

PROP ROW

REMOV CONC RIPRAP 57 SY

DW#10

INSTALL MAILBOX (SINGLE) (1 EA)

EXIST EOP

REMOV MBGF (189 LF)

REMOV 205 LF CURB & GUTTER

EXIST ROW

REMOV TAS (1 EA)

PROP ROW

END SAWTOOTH CURB STA 36+65.00 (SEE MISCELLANEOUS DETAILS)

REMOV CONC RIPRAP 28 SY

RIPRAP (CONC) (4 IN) (2 CY)

BEGIN SAWTOOTH CURB STA 36+45.00 (SEE MISCELLANEOUS DETAILS)

R13901
ORMAND ORISON W JR ESTATE & LENA MARIE
2

R14012
RHANDA MCGAUGH
6

R13919
HUNTER WHEELER & THOMAS HARRINGTON
7

BEGIN SAWTOOTH CURB STA 35+46.00 (SEE MISCELLANEOUS DETAILS)

RIPRAP (CONC) (4 IN) (2 CY)

END SAWTOOTH CURB STA 35+66.00 (SEE MISCELLANEOUS DETAILS)

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

760 755 750 745

VPC 33+25.00 EL= 751.53'

VPT 33+20.00 EL= 751.60'

VPT 37+25.00 EL= 751.05'

PROP PGL @ ℄

EXIST GROUND @ ℄

(-)1.3913 % (+)1.1500 %

CULVERT 02
STA 35+59
1-18"x61' RCP
E= 746.44'

STA = 35+25.00
EL = 748.75'
ex = 1.27'
K = 157
L = 400.00'

PROPOSED	752.11	752.20	752.18	752.07	751.85	751.53	751.20	750.92	750.67	750.46	750.29	750.16	750.07	750.02	750.01	750.04	750.11	750.22	750.37	750.55	750.78	751.05	751.34
EXISTING	752.66	752.56	752.26	751.98	751.69	751.41	751.14	750.87	750.60	750.36	750.20	750.04	749.88	749.74	749.76	749.88	750.04	750.23	750.44	750.63	750.84	751.05	751.31

32+00 33+00 34+00 35+00 36+00 37+00

PRELIMINARY

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Under the authority of:

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DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

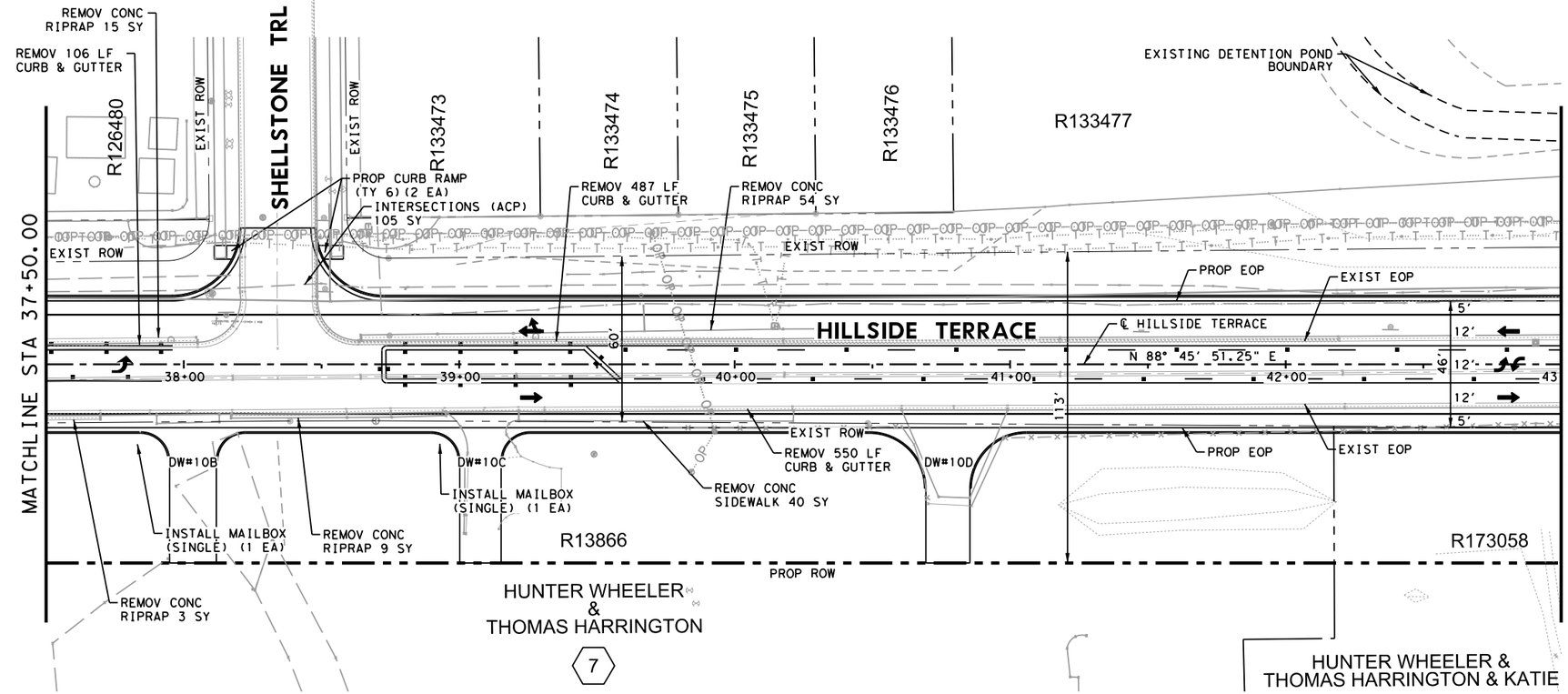
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HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 5 OF 22
DRAWN BY:		97
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:03:24 PM
c:\pwworkdir\bgepw-projects\mhancock\dms05975\HST*PP*05.dgn pdf.pltcfg

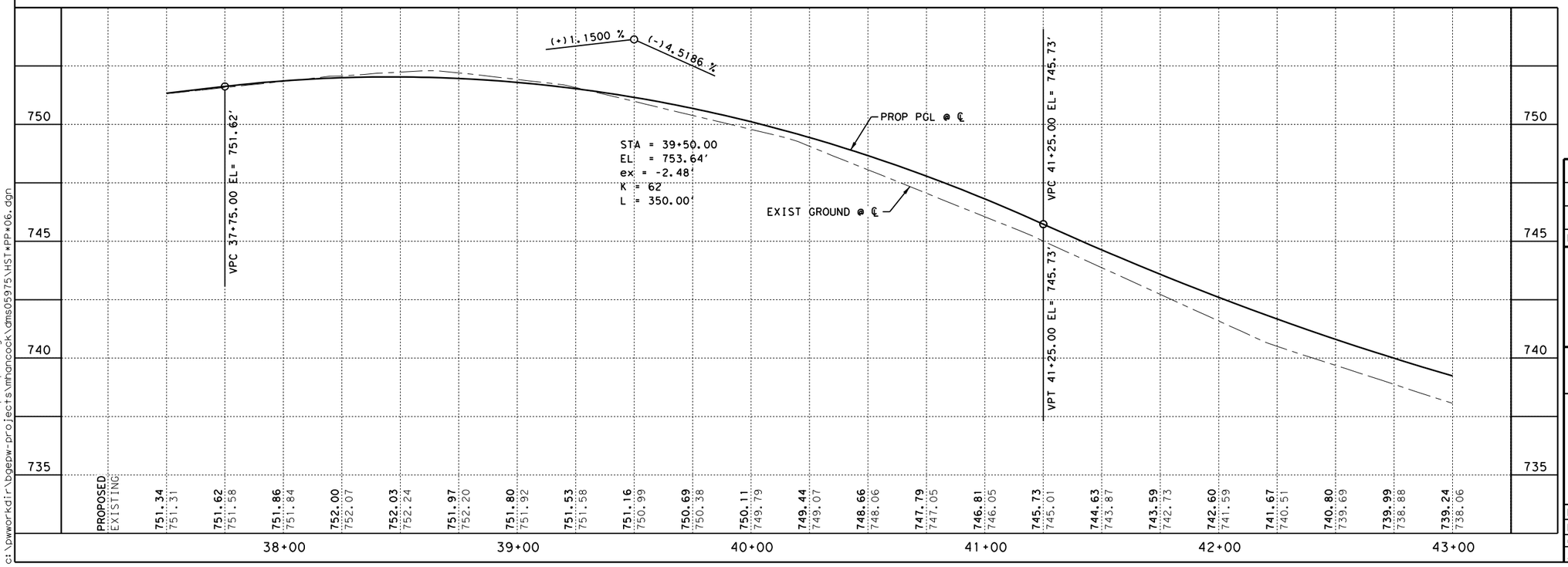


LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V



PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

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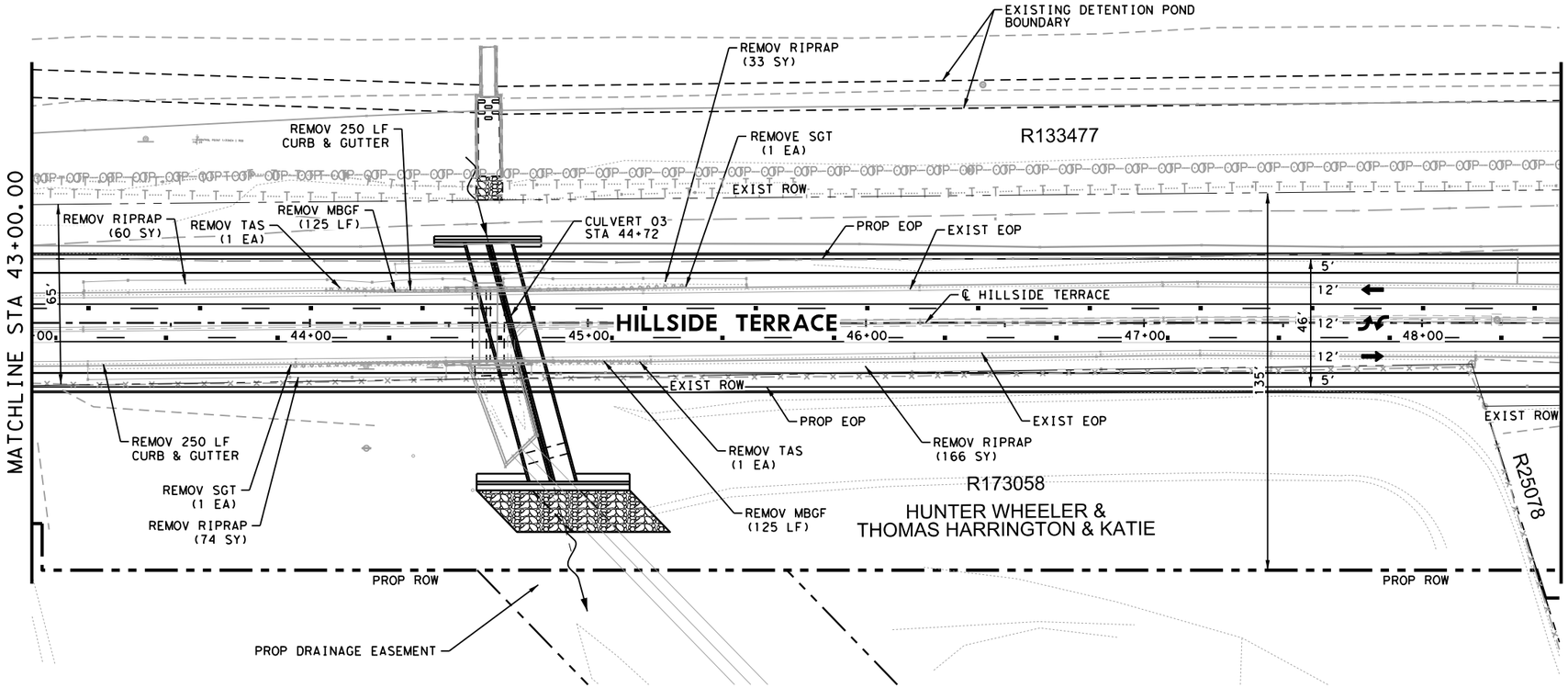
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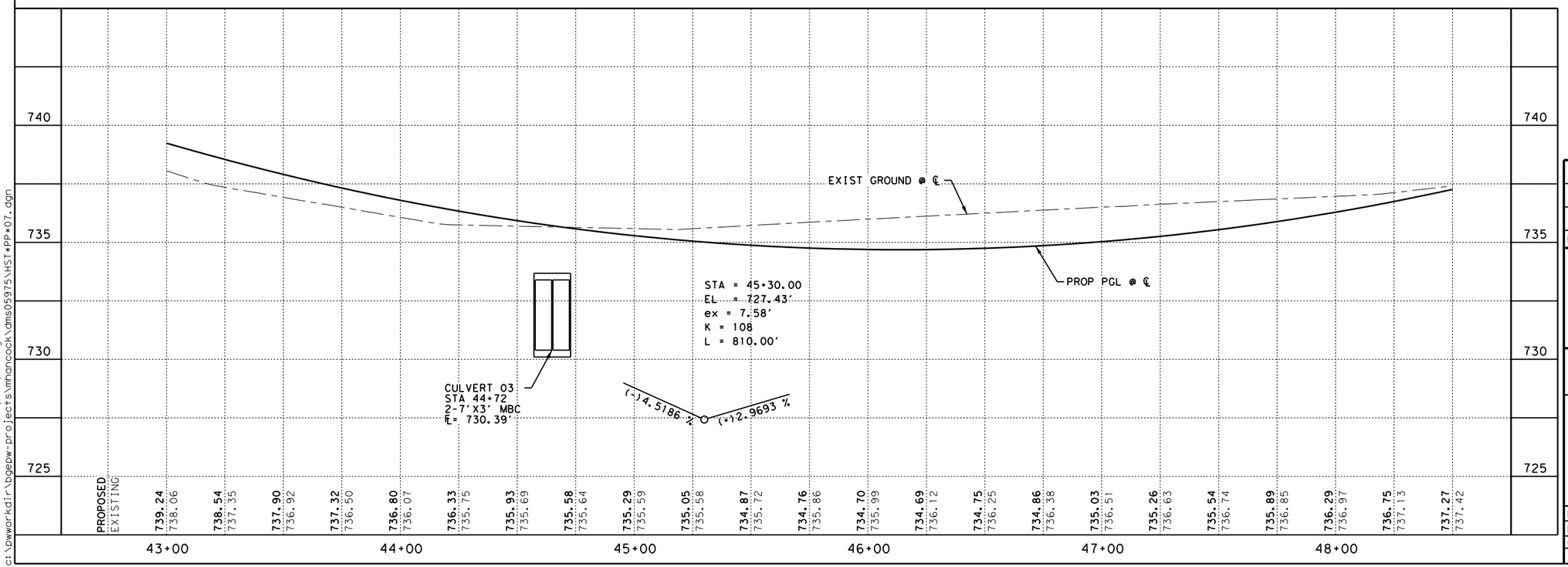
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 6 OF 22
DRAWN BY:		98
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:03:35 PM pdf.pltcfg
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
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HAYS COUNTY STATE OF TEXAS

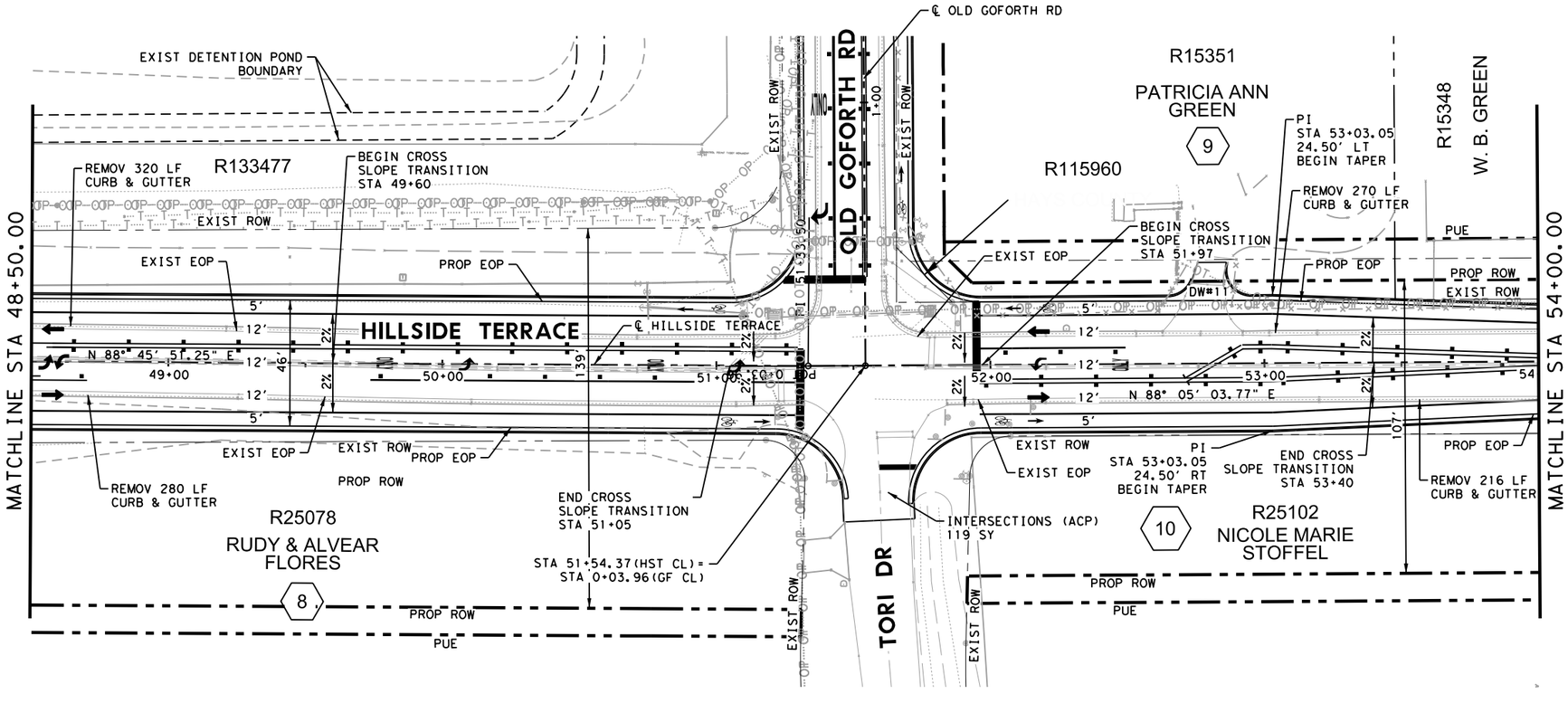
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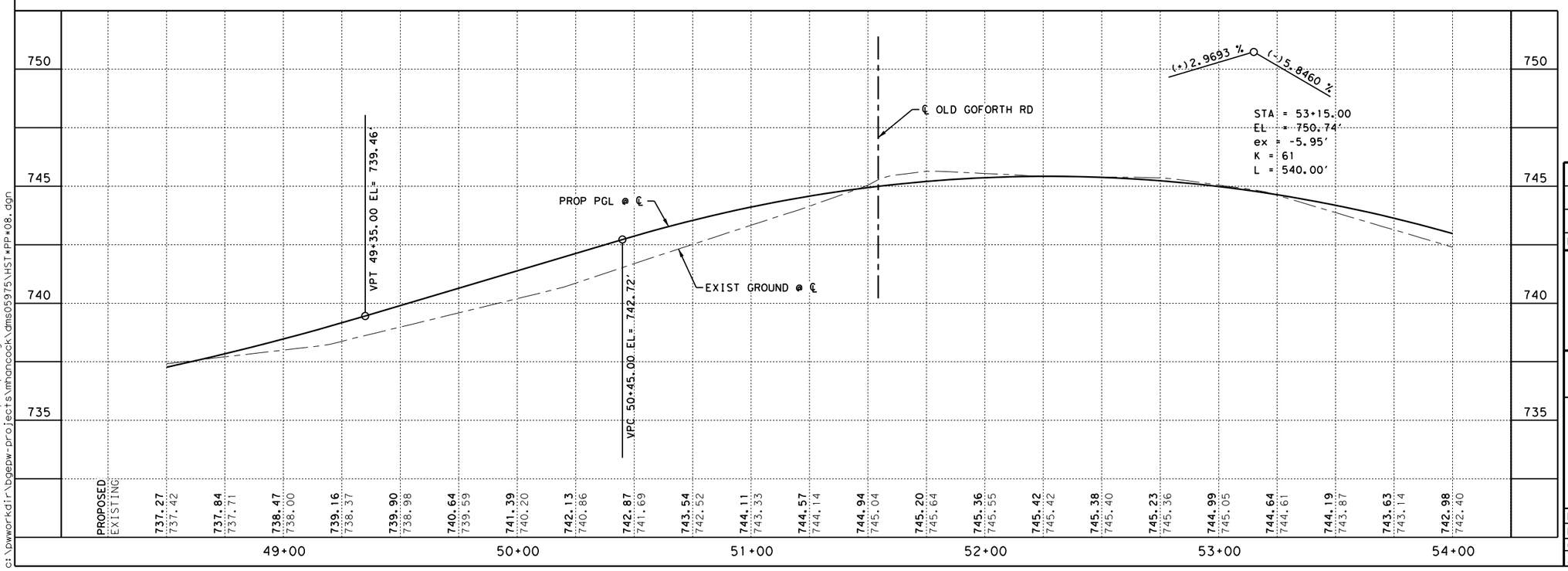
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 7 OF 22
DRAWN BY:		99
CHECKED BY:		
APPROVED BY:		

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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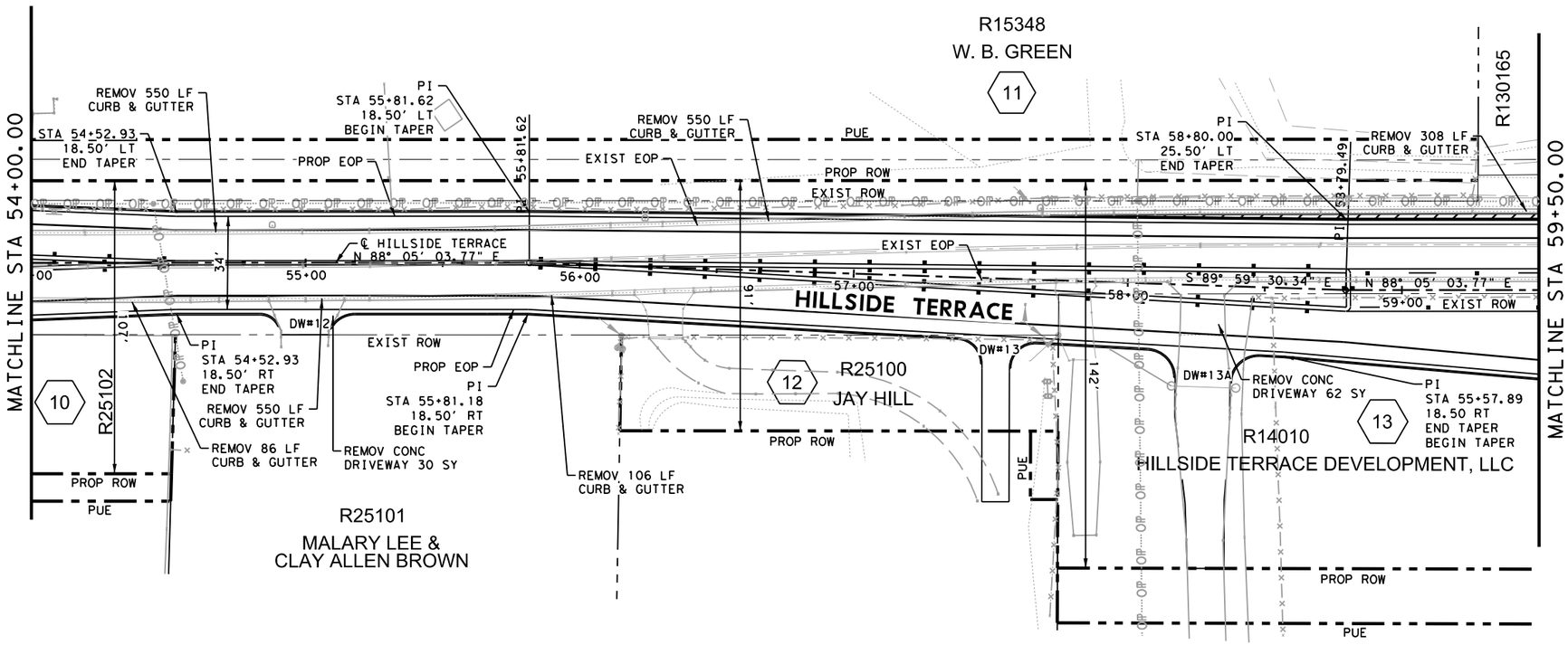
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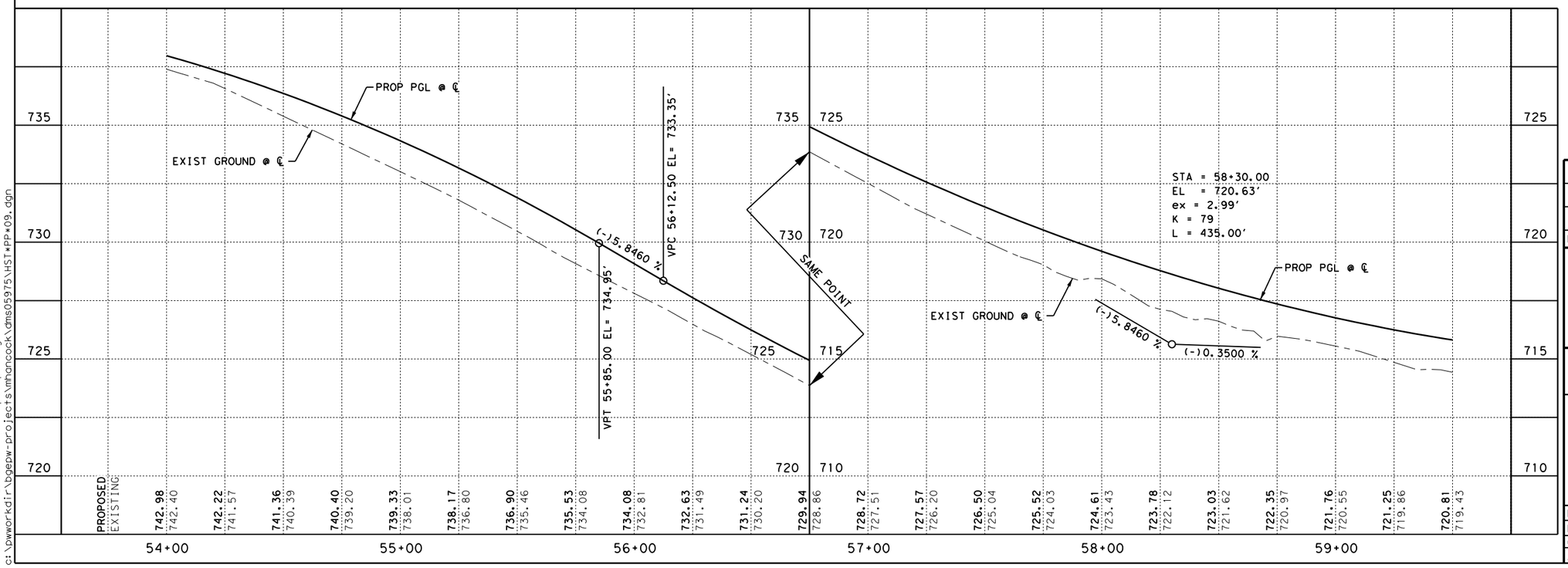
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 8 OF 22
DRAWN BY:		
CHECKED BY:		100
APPROVED BY:		

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

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DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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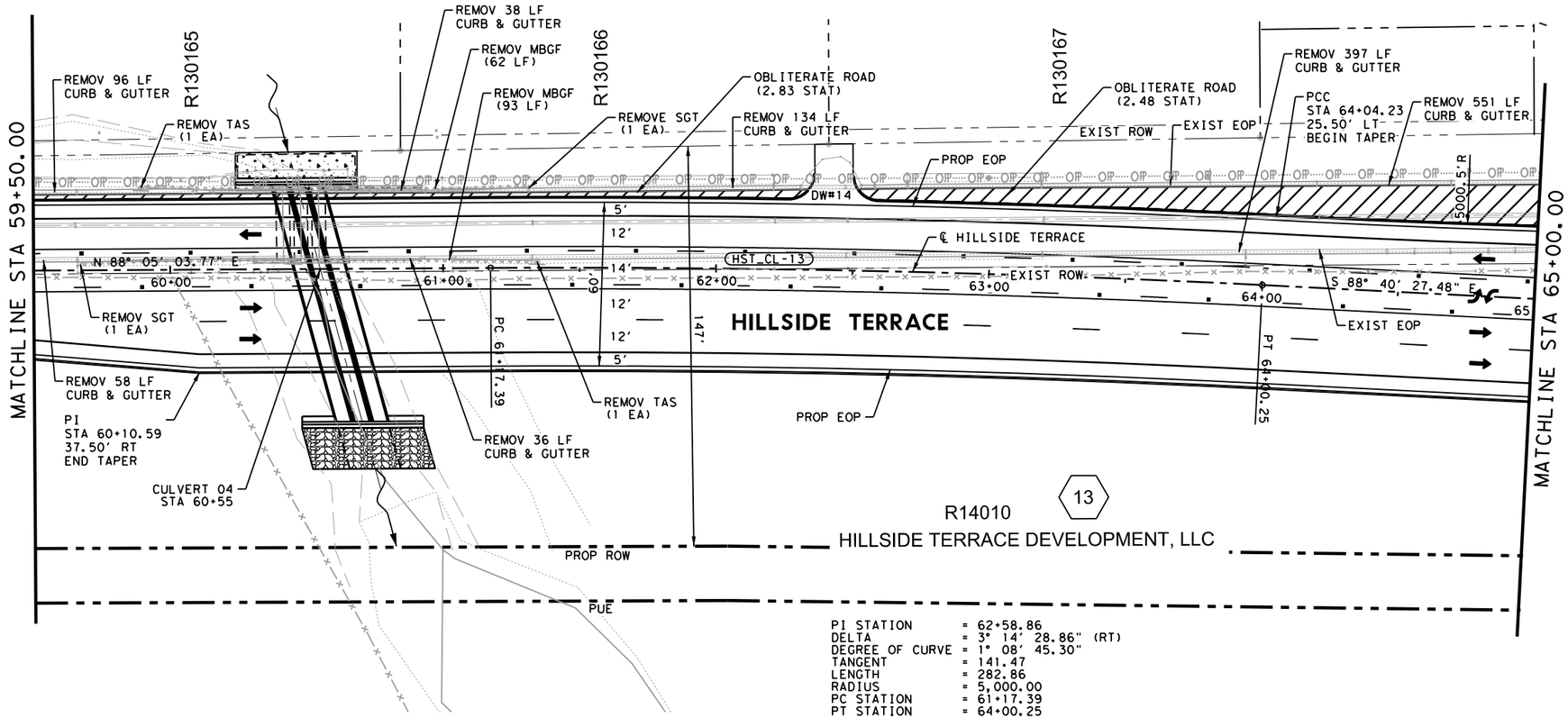
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HILLSIDE TERRACE

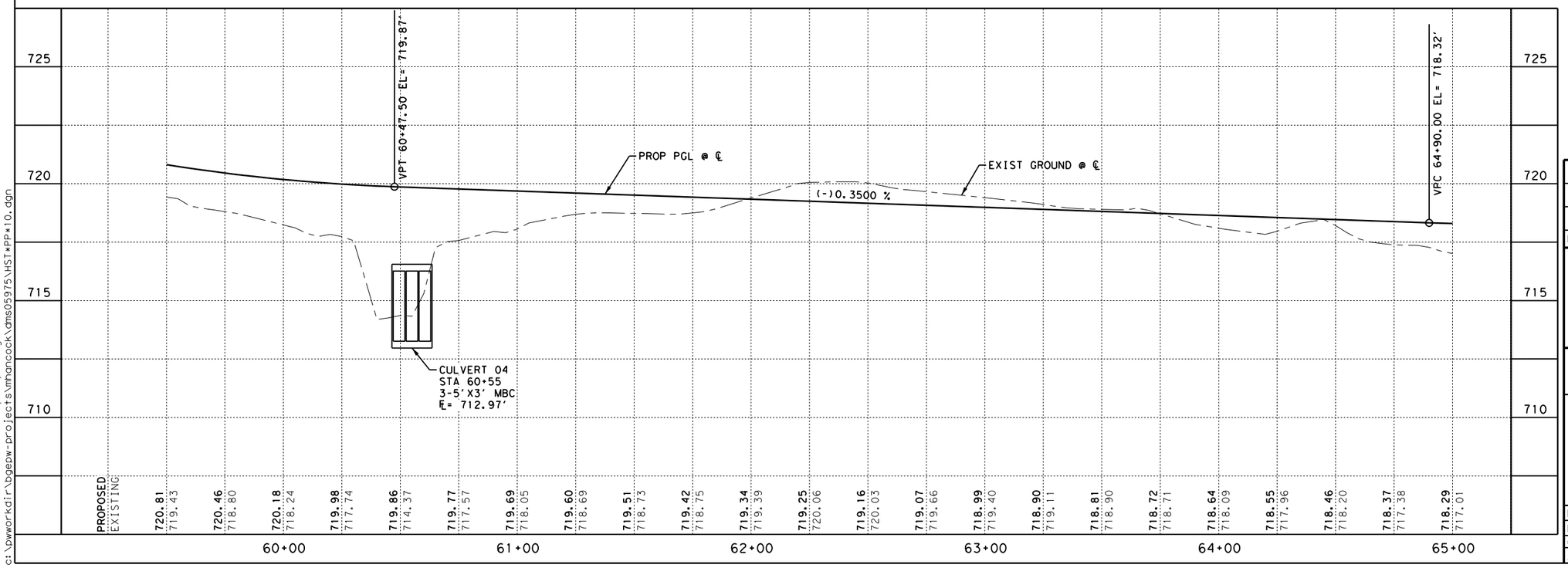
ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 9 OF 22
DRAWN BY:		101
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:03:51 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms05975\HST*PP*09.dgn



PI STATION = 62+58.86
DELTA = 3° 14' 28.86" (RT)
DEGREE OF CURVE = 1° 08' 45.30"
TANGENT = 141.47
LENGTH = 282.86
RADIUS = 5,000.00
PC STATION = 61+17.39
PT STATION = 64+00.25



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c:\pwworkdir\bgepw-projects\mhancock\dms05975\HST*PP*10.dgn

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

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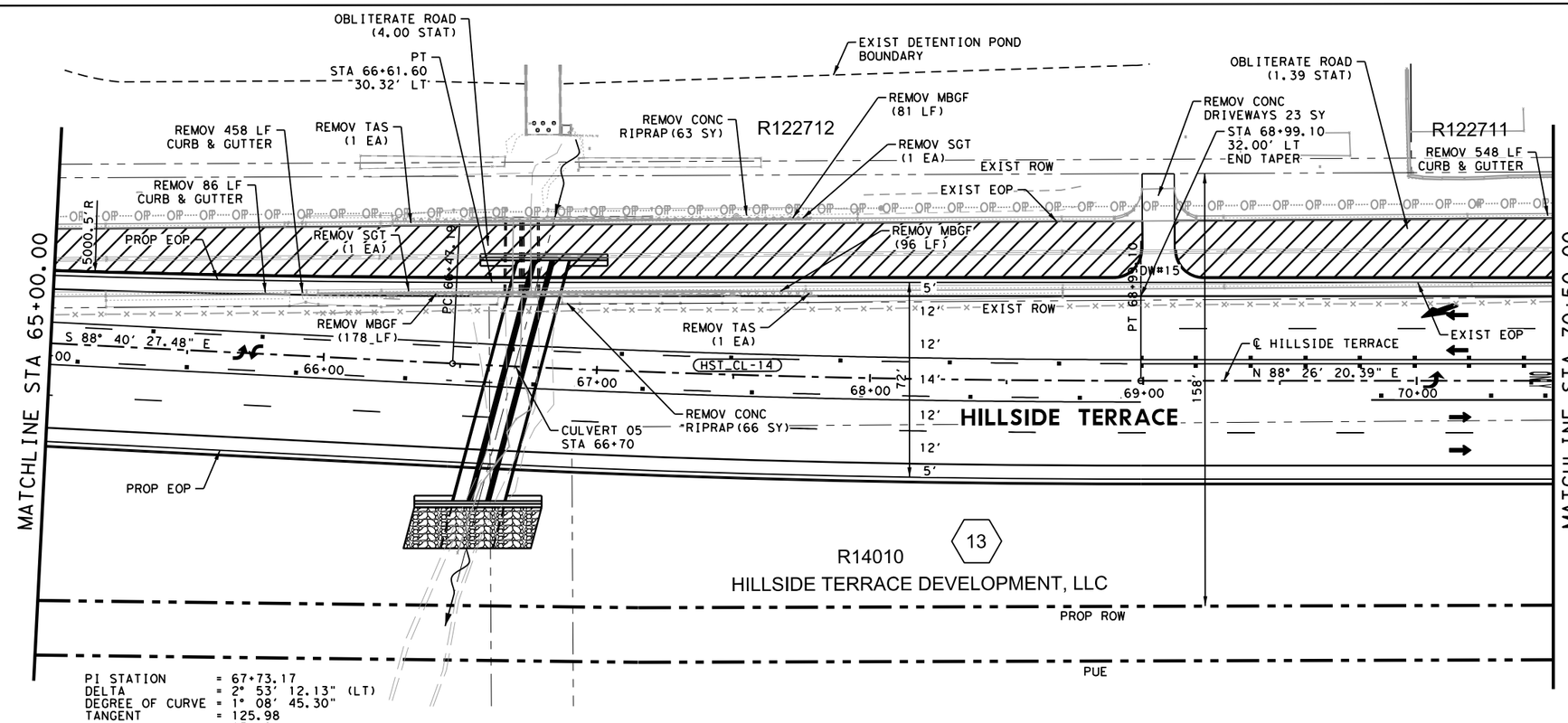
NO.	DATE	REVISION	APPROVED

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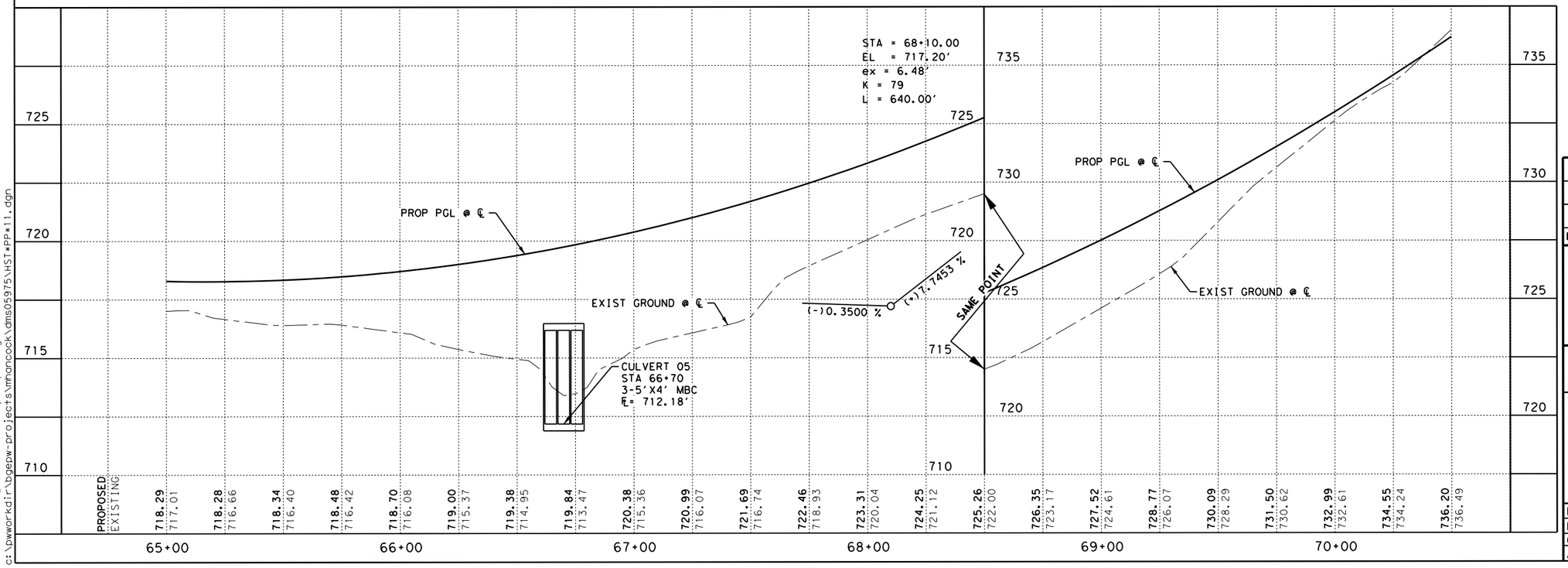
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 10 OF 22
DRAWN BY:		102
CHECKED BY:		
APPROVED BY:		



PI STATION = 67+73.17
DELTA = 2° 53' 12.13" (LT)
DEGREE OF CURVE = 1° 08' 45.30"
TANGENT = 125.98
LENGTH = 251.91
RADIUS = 5,000.00
PC STATION = 66+47.19
PT STATION = 68+99.10



LEGEND:

- DIRECTION OF TRAFFIC
- DW# — DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) — ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) — PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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NO.	DATE	REVISION	APPROVED

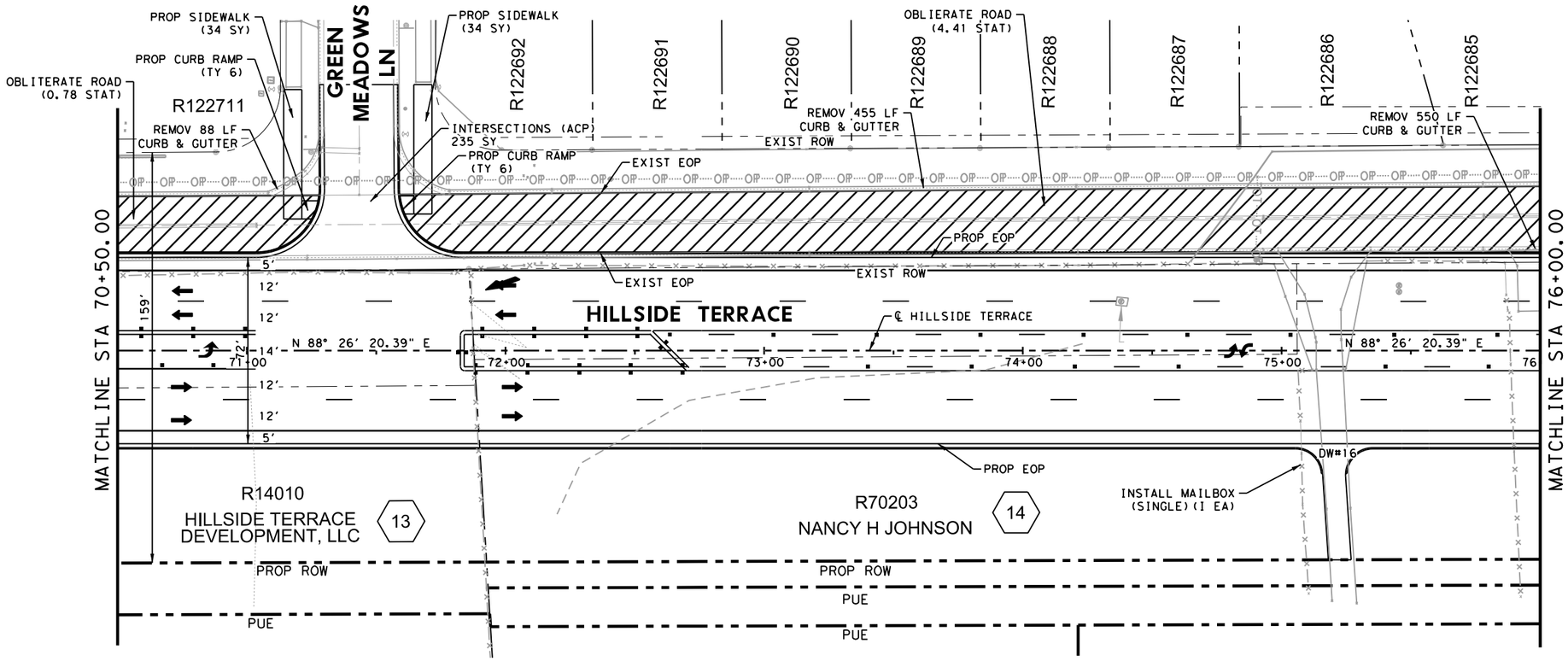
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HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 11 OF 22
DRAWN BY:		103
CHECKED BY:		
APPROVED BY:		

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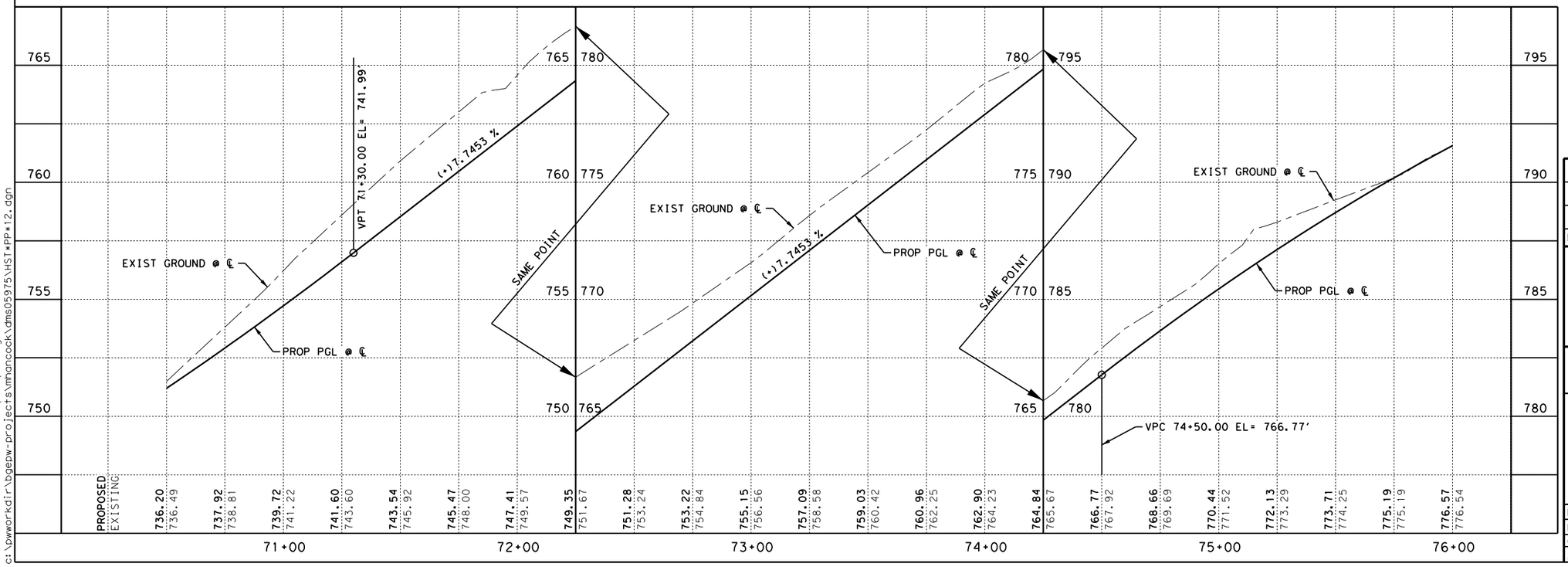
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50

SCALE: 1"=50' H
1"=5' V



PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

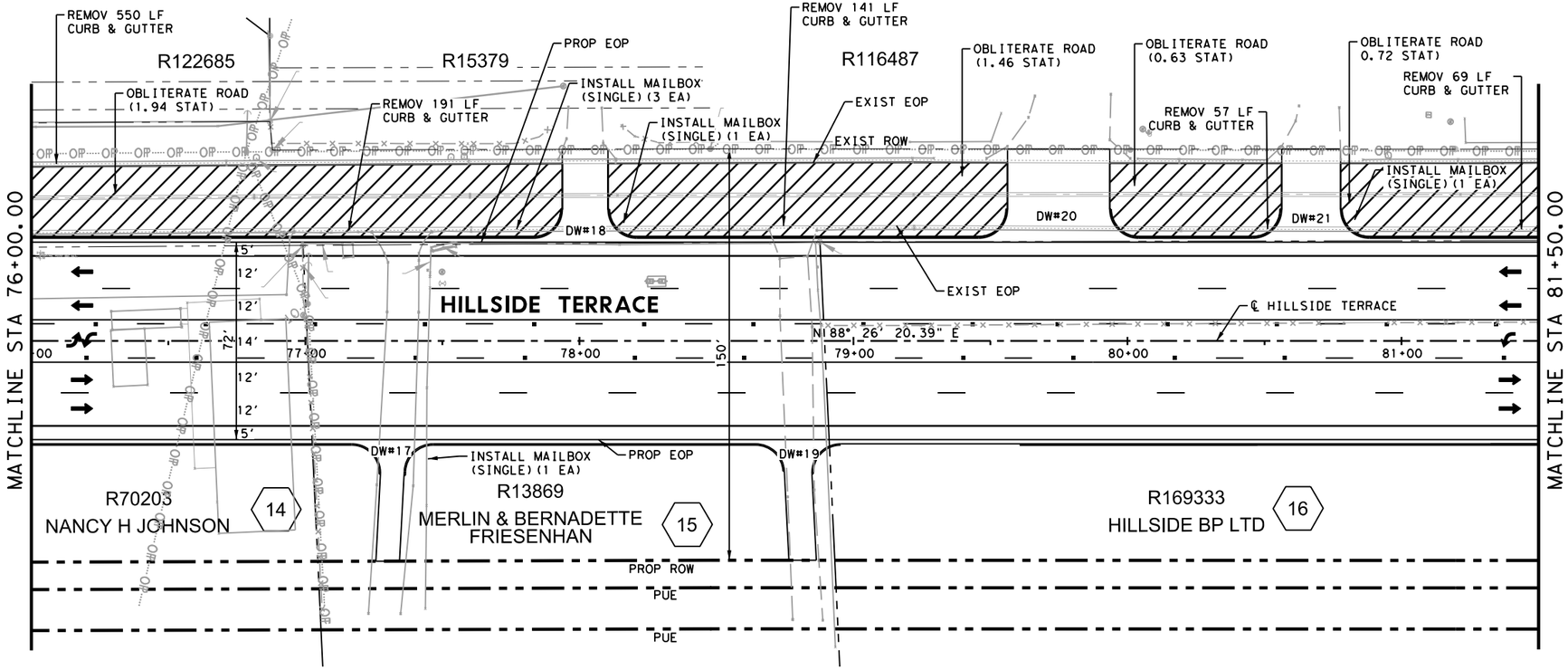
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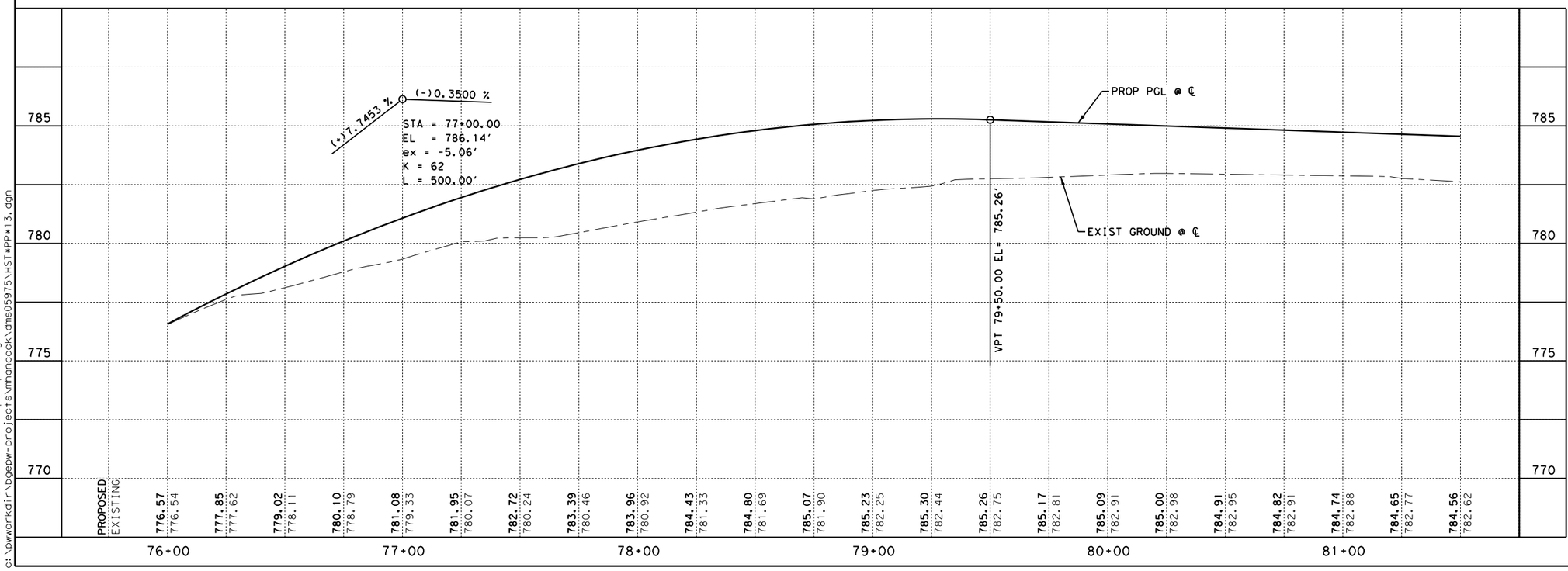
HILLSIDE TERRACE

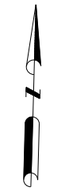
ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 12 OF 22
DRAWN BY:		104
CHECKED BY:		
APPROVED BY:		

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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NO.	DATE	REVISION	APPROVED

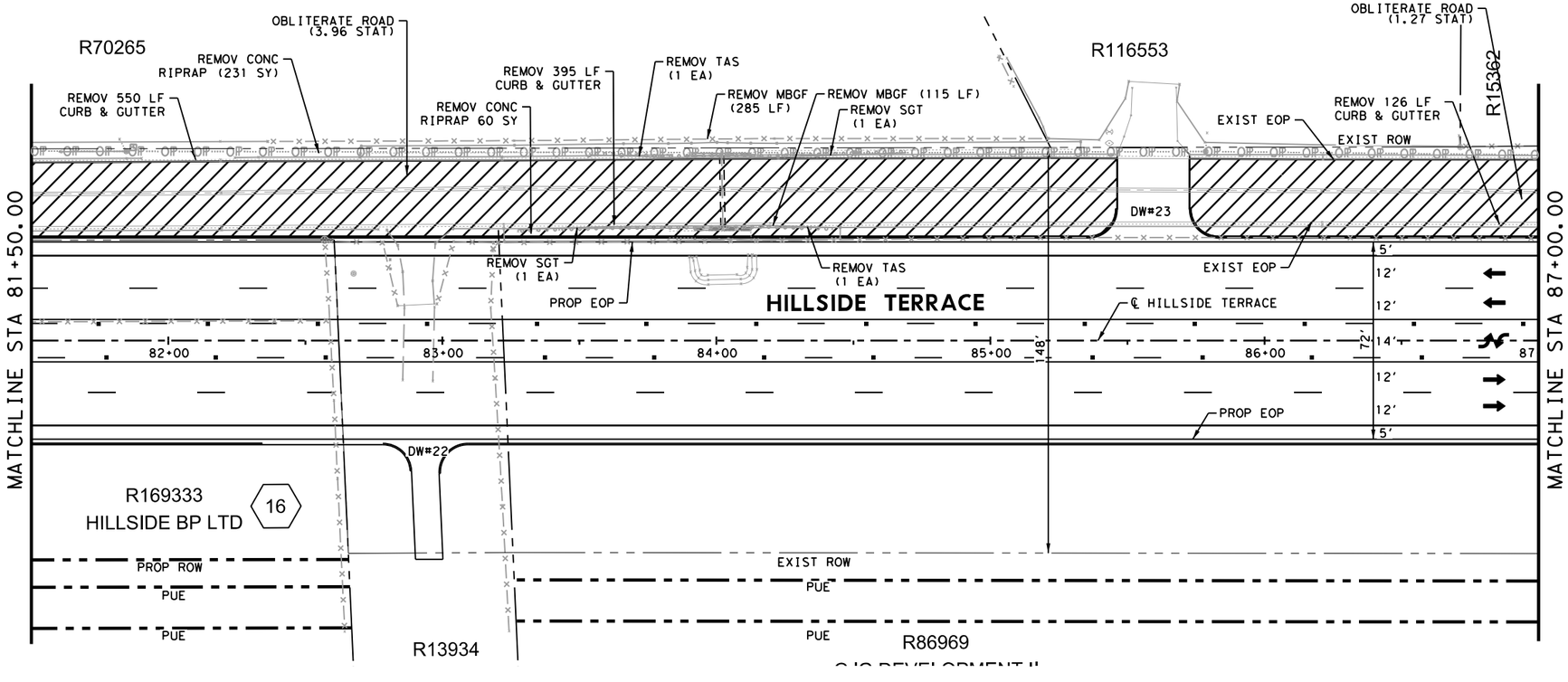
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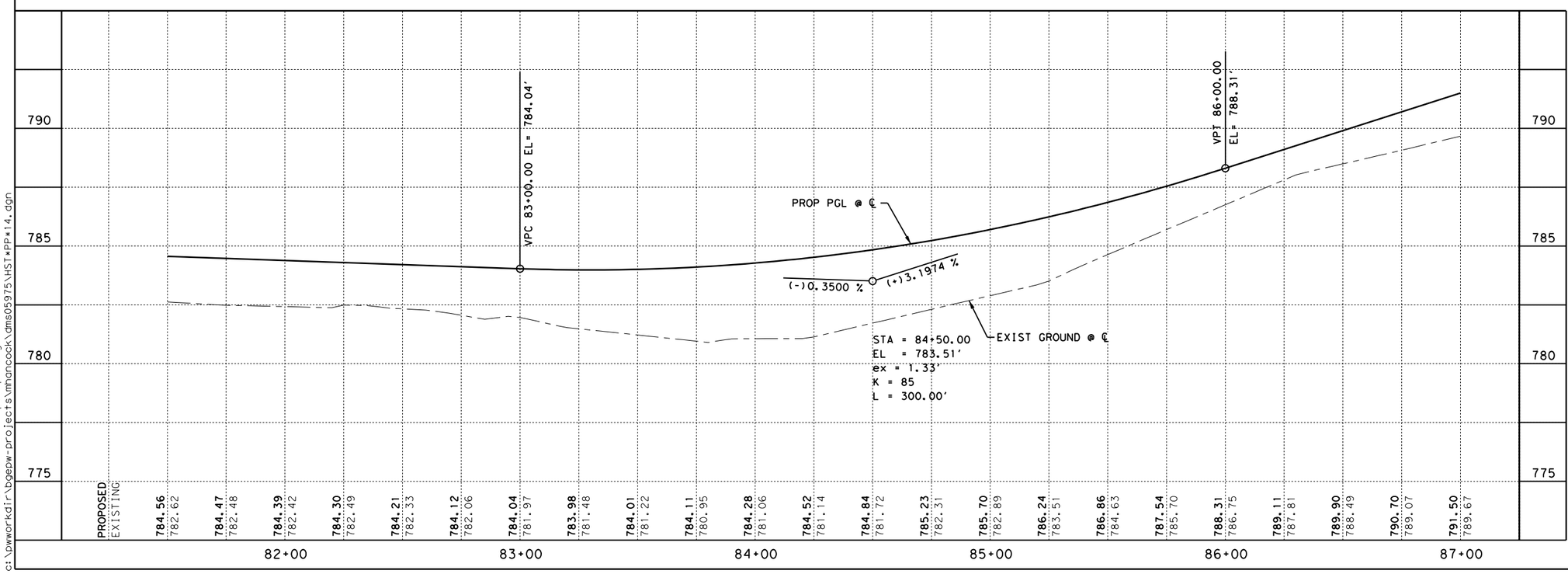
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 13 OF 22
DRAWN BY:		105
CHECKED BY:		
APPROVED BY:		

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N

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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NO.	DATE	REVISION	APPROVED

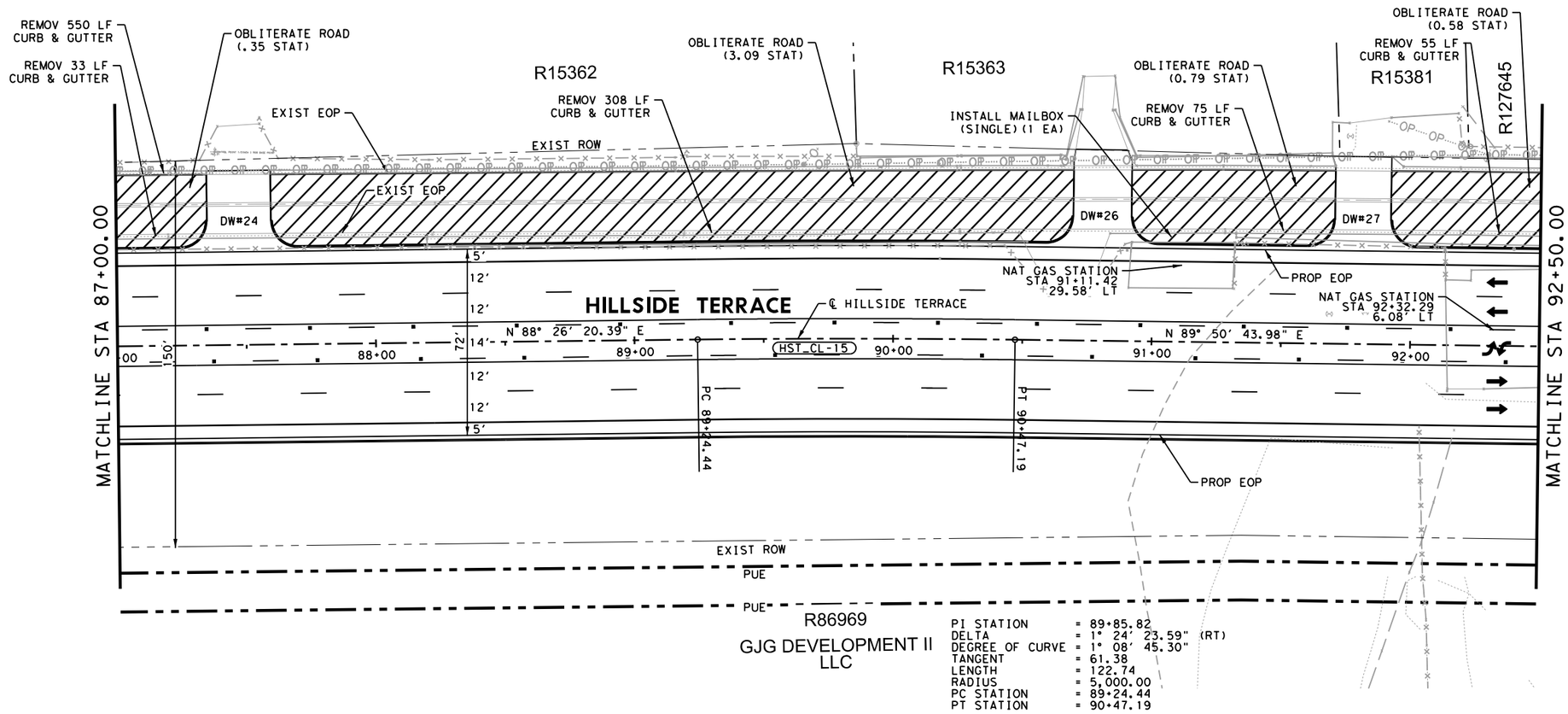
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HILLSIDE TERRACE

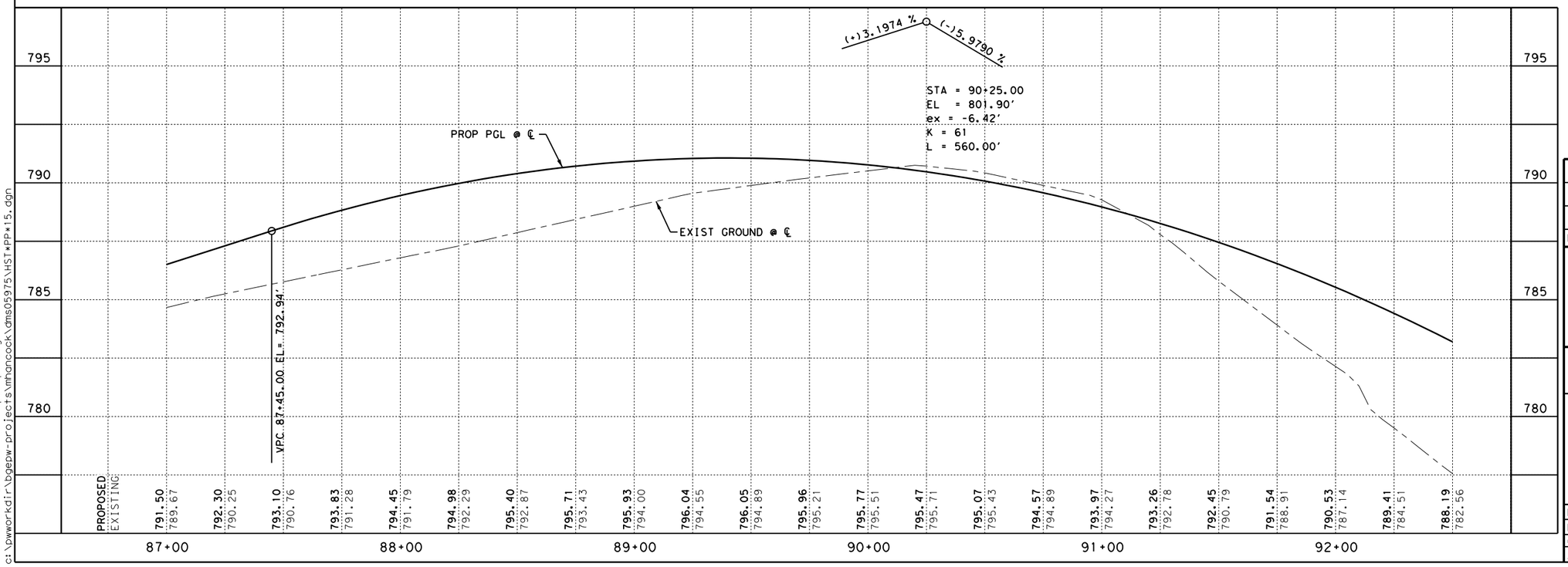
ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 14 OF 22
DRAWN BY:		106
CHECKED BY:		
APPROVED BY:		

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PI STATION = 89+85.82
DELTA = 1° 24' 23.59" (RT)
DEGREE OF CURVE = 1° 08' 45.30"
TANGENT = 61.38
LENGTH = 122.74
RADIUS = 5,000.00
PC STATION = 89+24.44
PT STATION = 90+47.19



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N

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

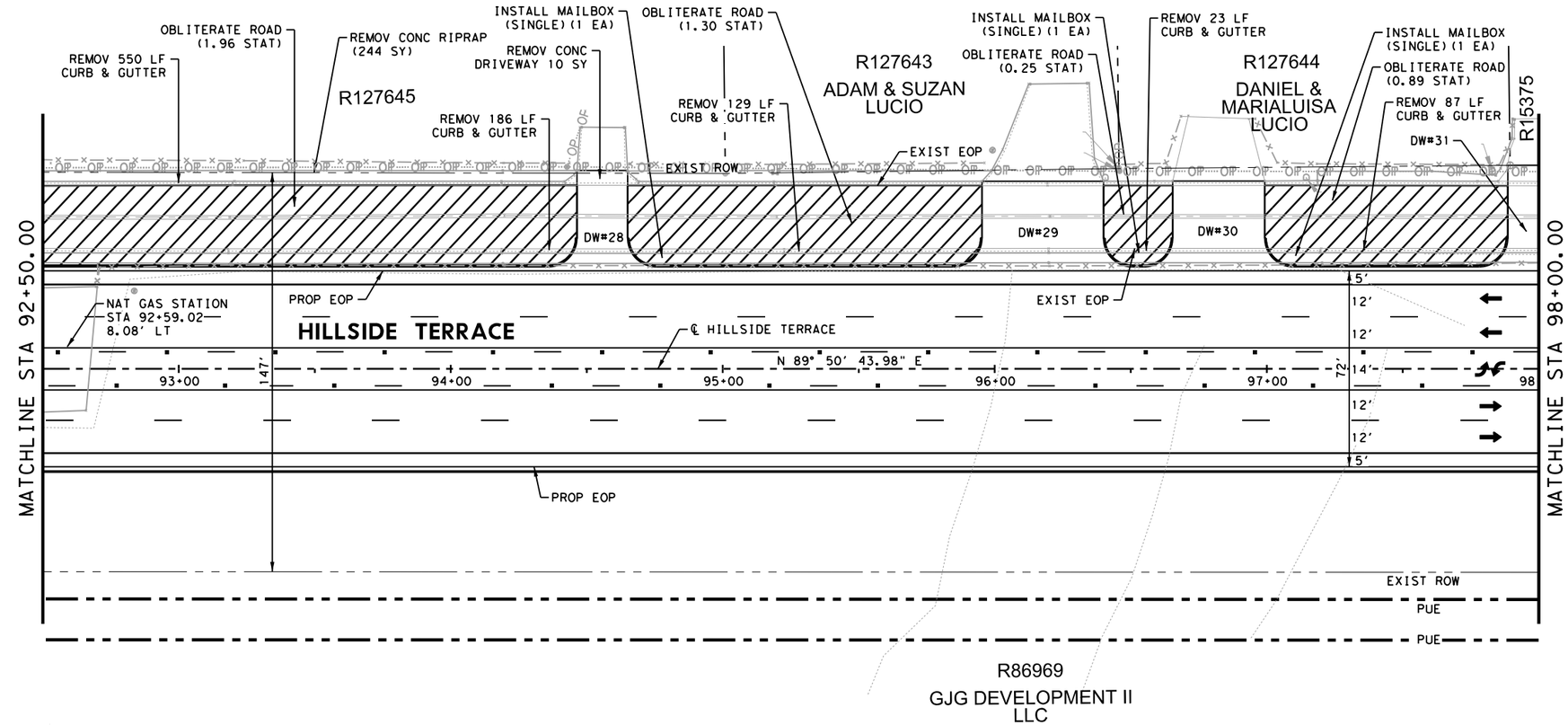
HAYS COUNTY STATE OF TEXAS

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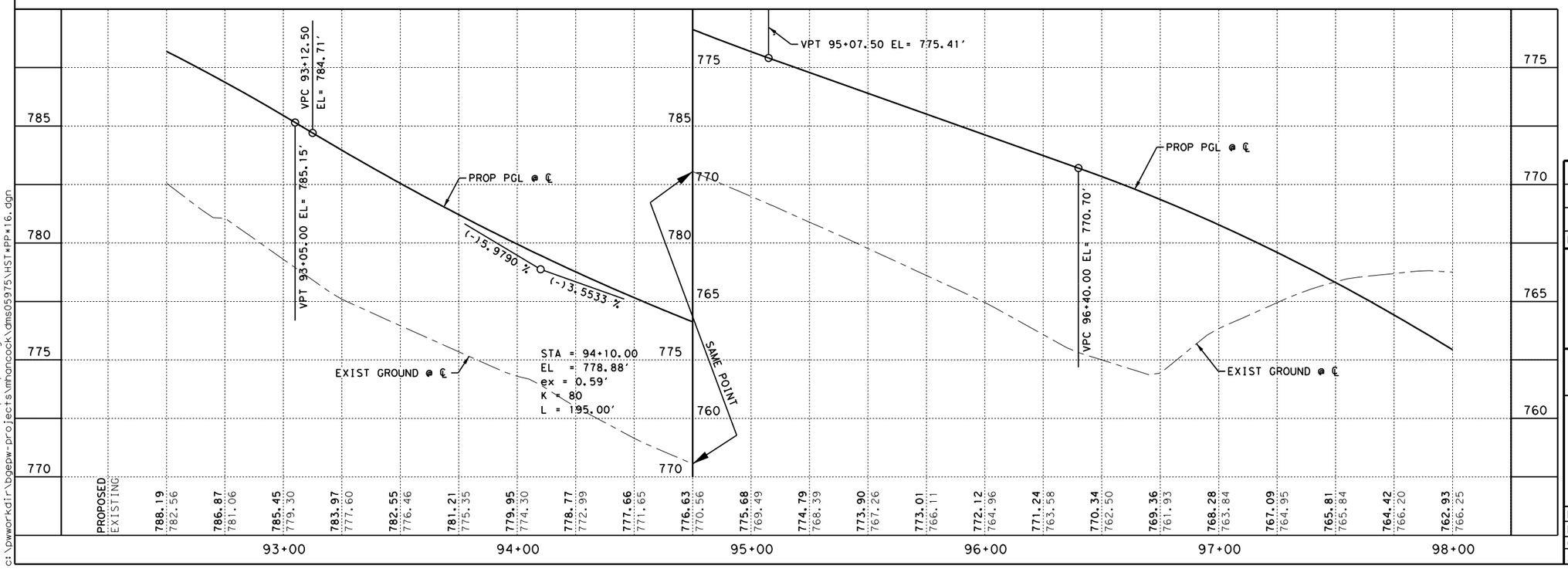
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 15 OF 22
DRAWN BY:		107
CHECKED BY:		
APPROVED BY:		



R86969
GJG DEVELOPMENT II LLC





LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

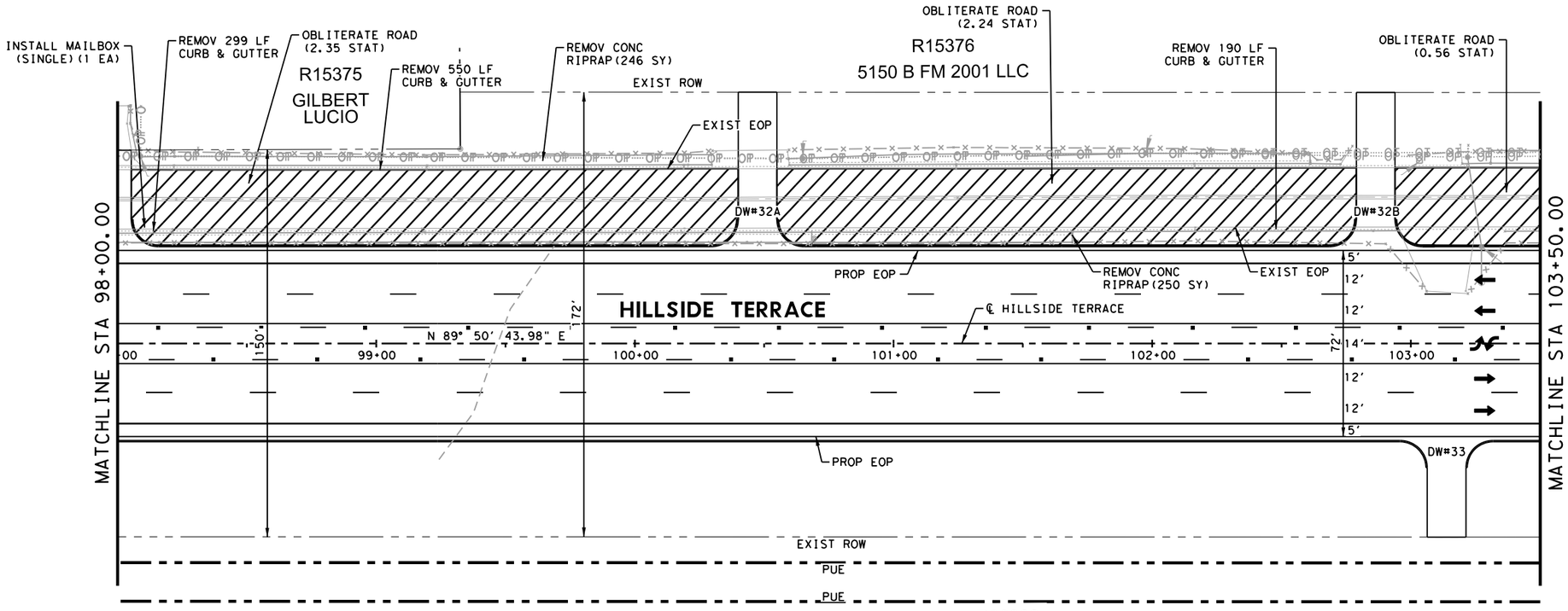
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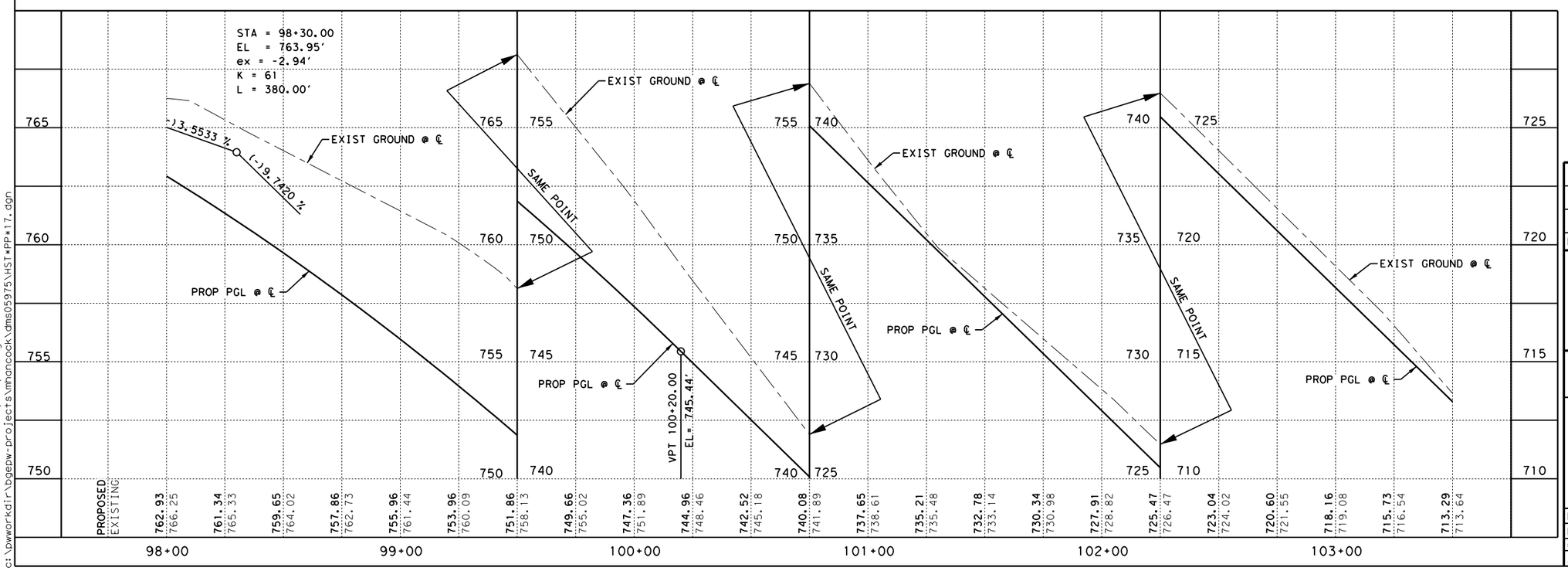
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 16 OF 22
DRAWN BY:		108
CHECKED BY:		
APPROVED BY:		

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- (CURVE #) ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

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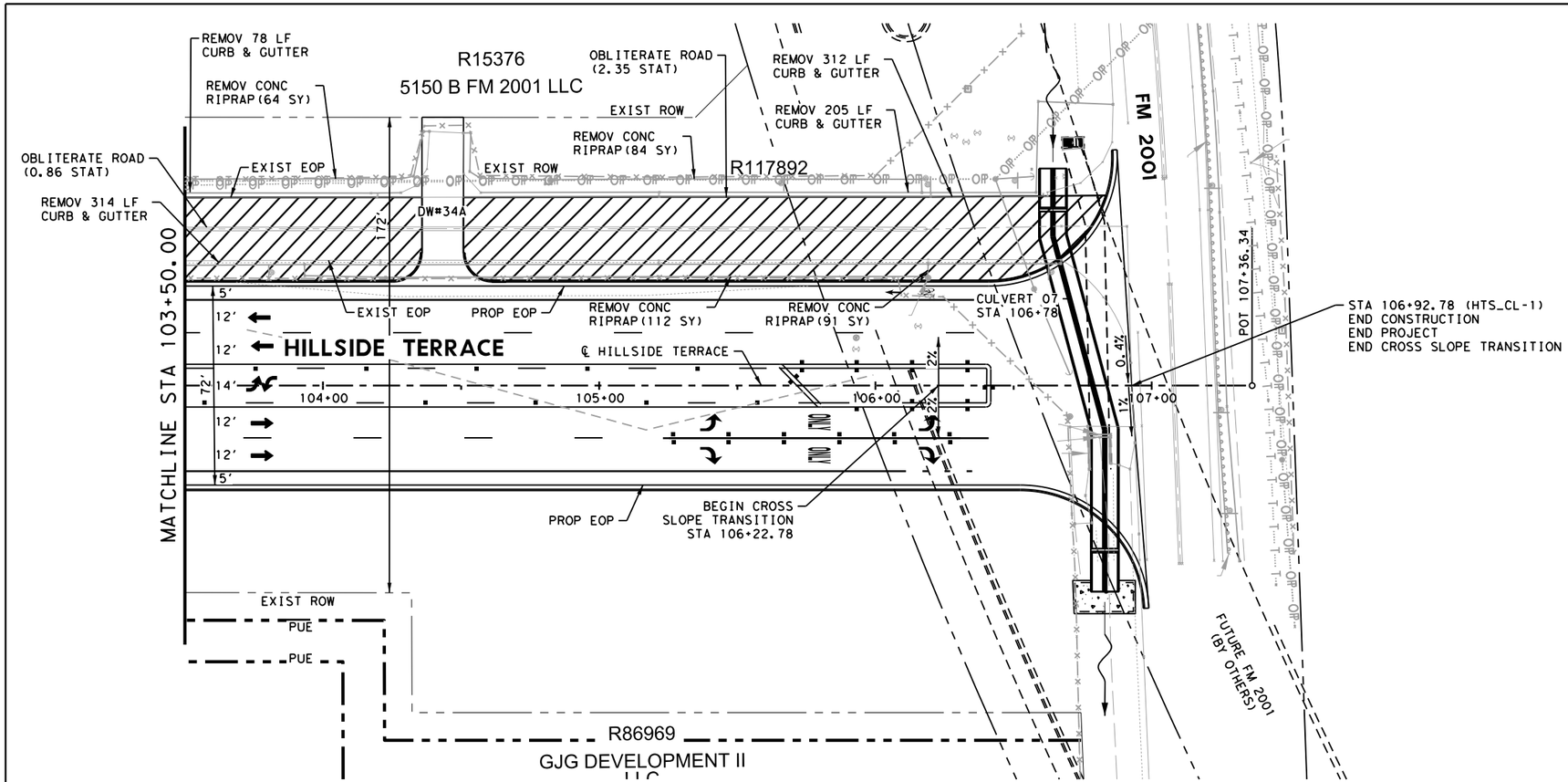
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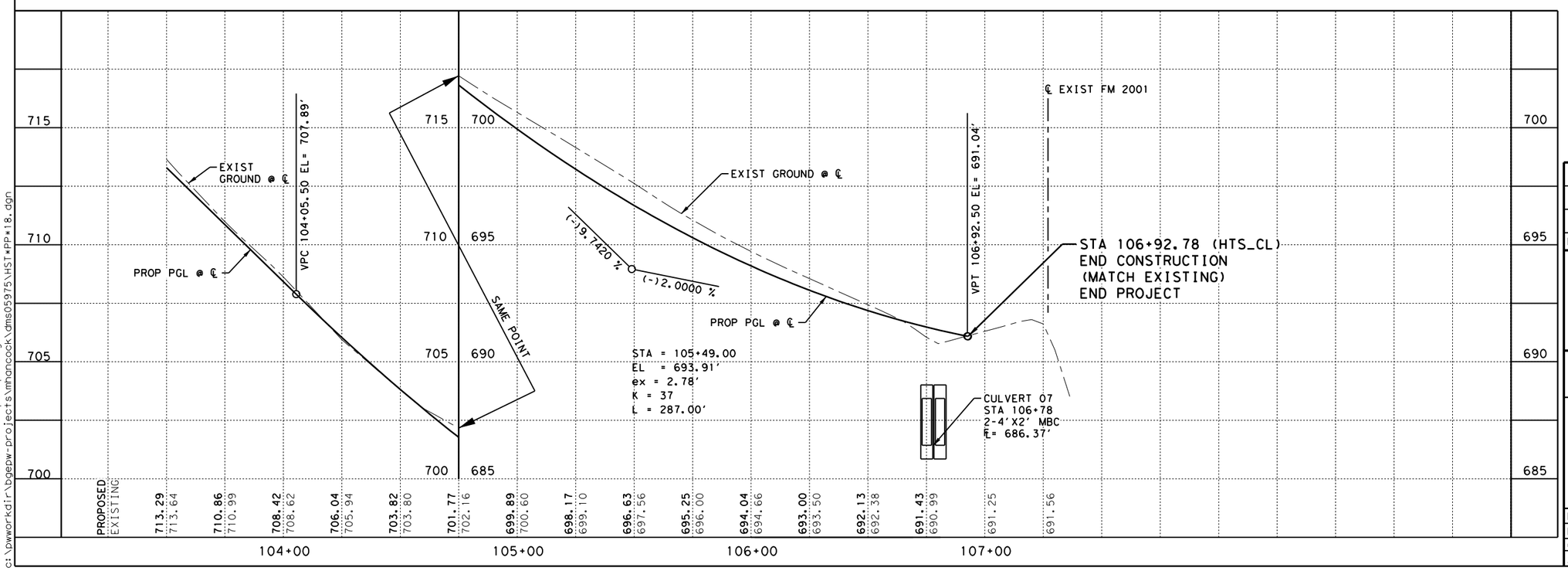
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

DESIGNED BY:		SHEET 17 OF 22
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CHECKED BY:		
APPROVED BY:		

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N

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

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HAYS COUNTY STATE OF TEXAS

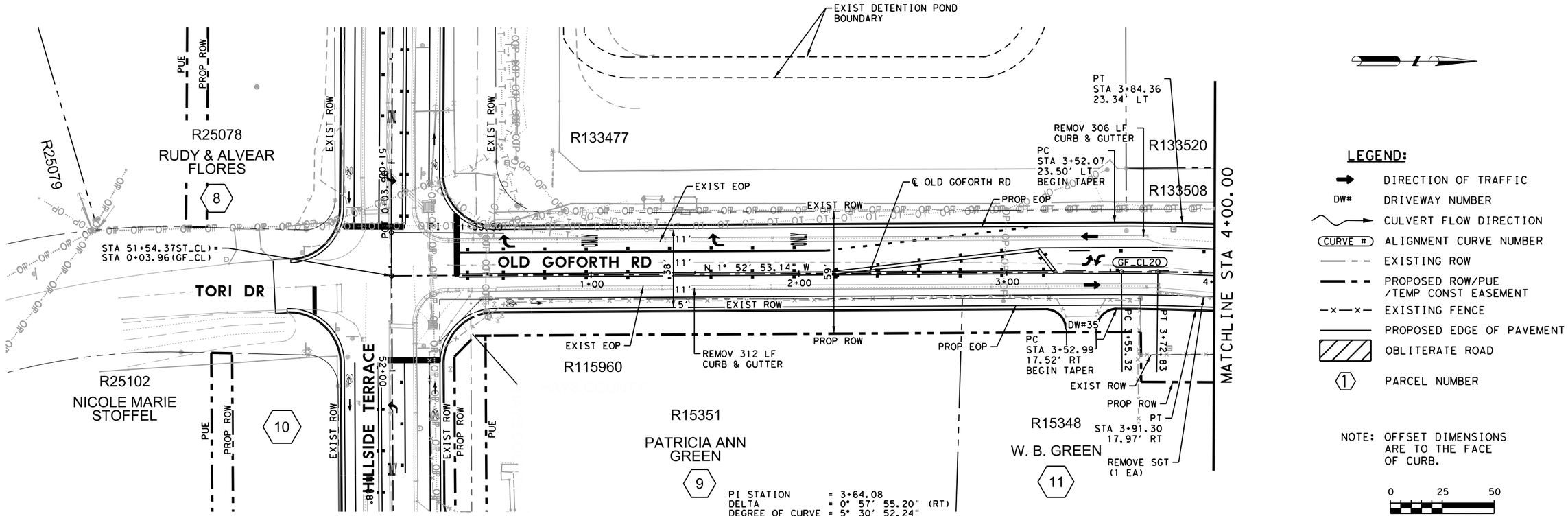
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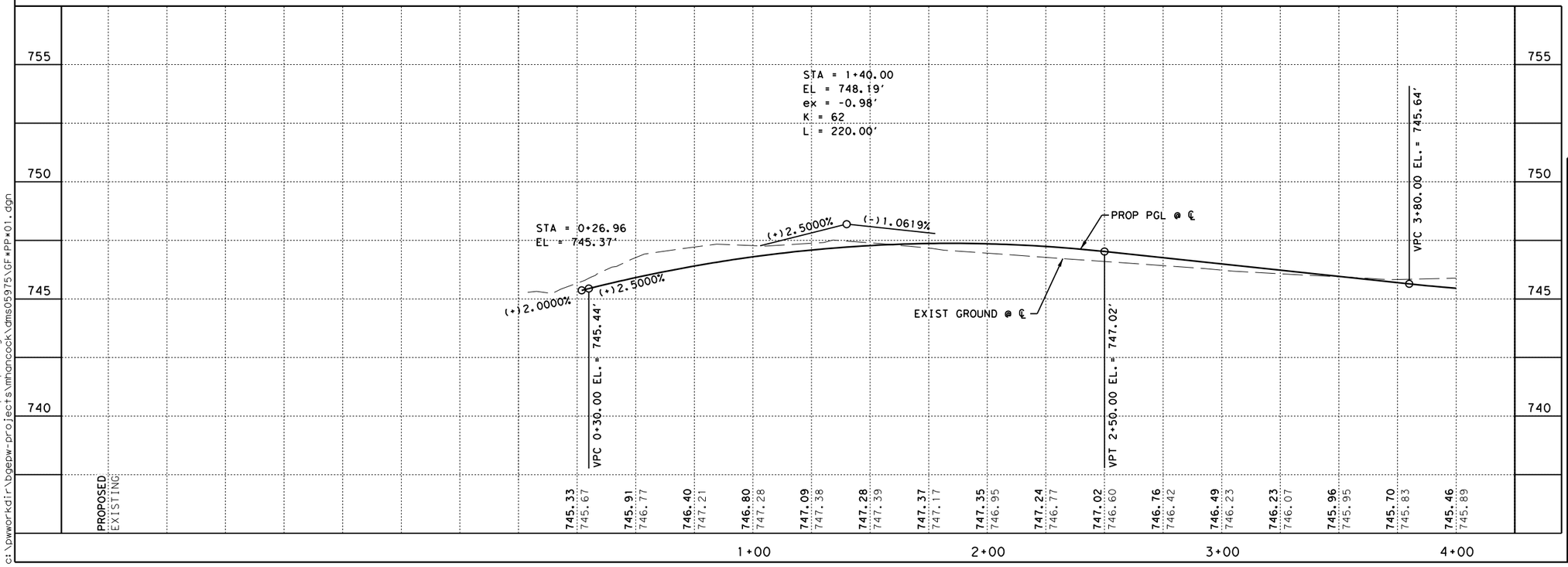
HILLSIDE TERRACE

ROADWAY PLAN & PROFILE

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CHECKED BY:		
APPROVED BY:		

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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HILLSIDE TERRACE

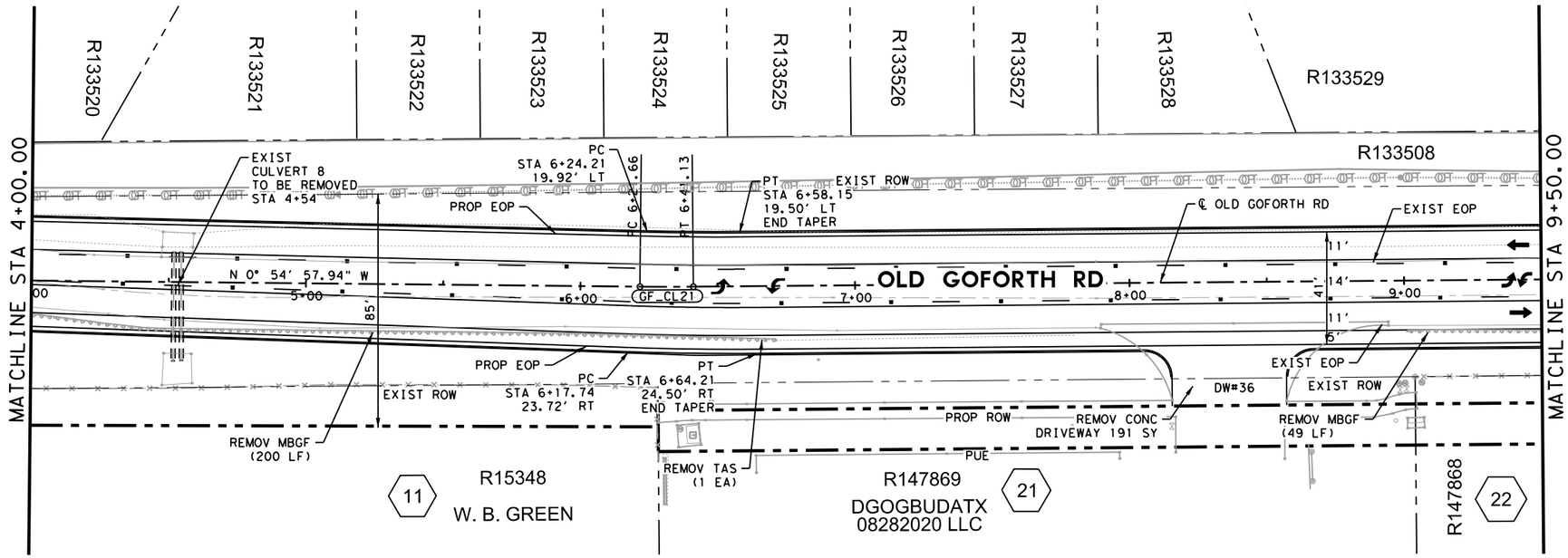
PLAN & PROFILE

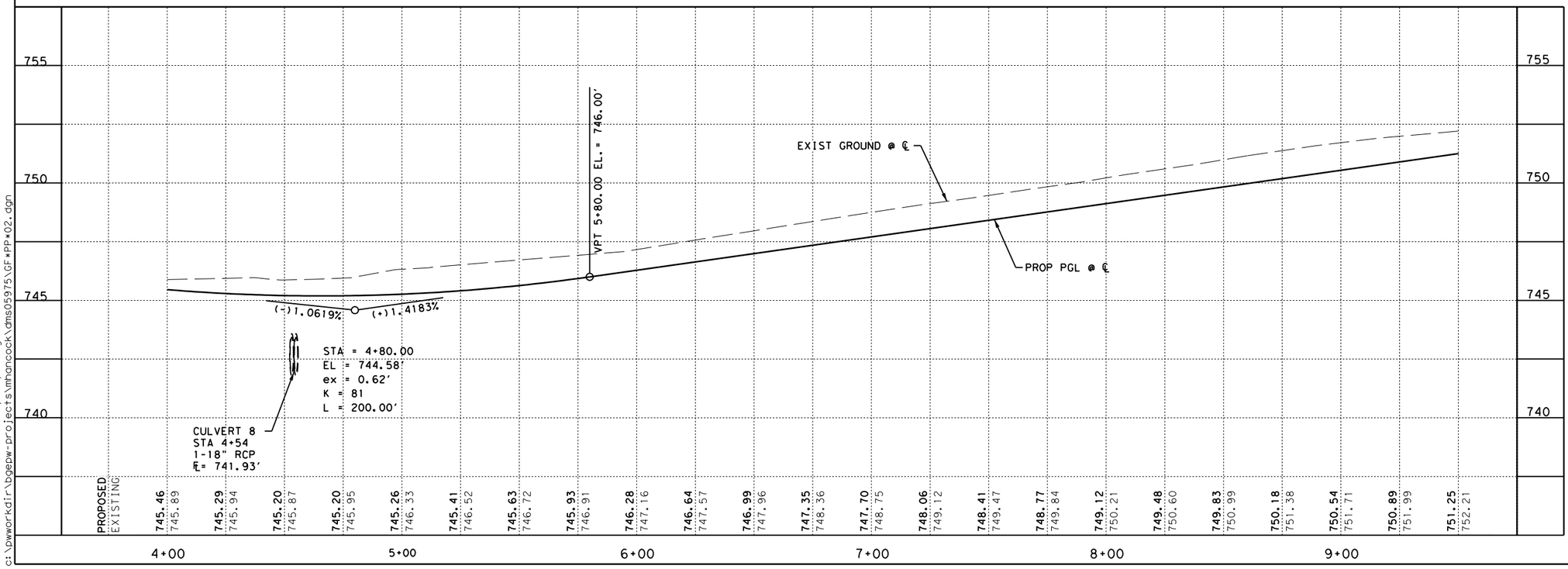
(OLD GOFORTH RD)

DESIGNED BY:		SHEET 19 OF 22
DRAWN BY:		111
CHECKED BY:		
APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\ams05975\GF*PP*01.dgn

PI STATION = 6+31.40
DELTA = 1° 04' 24.82" (LT)
DEGREE OF CURVE = 5° 30' 52.24"
TANGENT = 9.73
LENGTH = 19.47
RADIUS = 1,039.00
PC STATION = 6+21.66
PT STATION = 6+41.13





LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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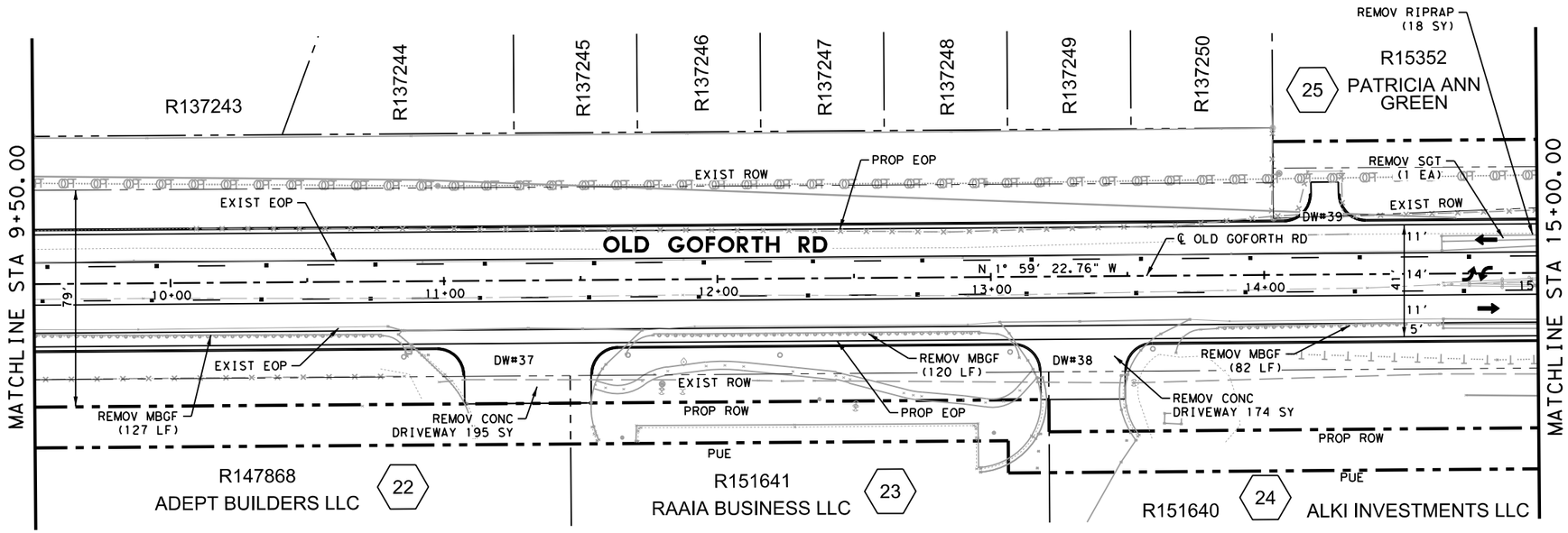
HILLSIDE TERRACE

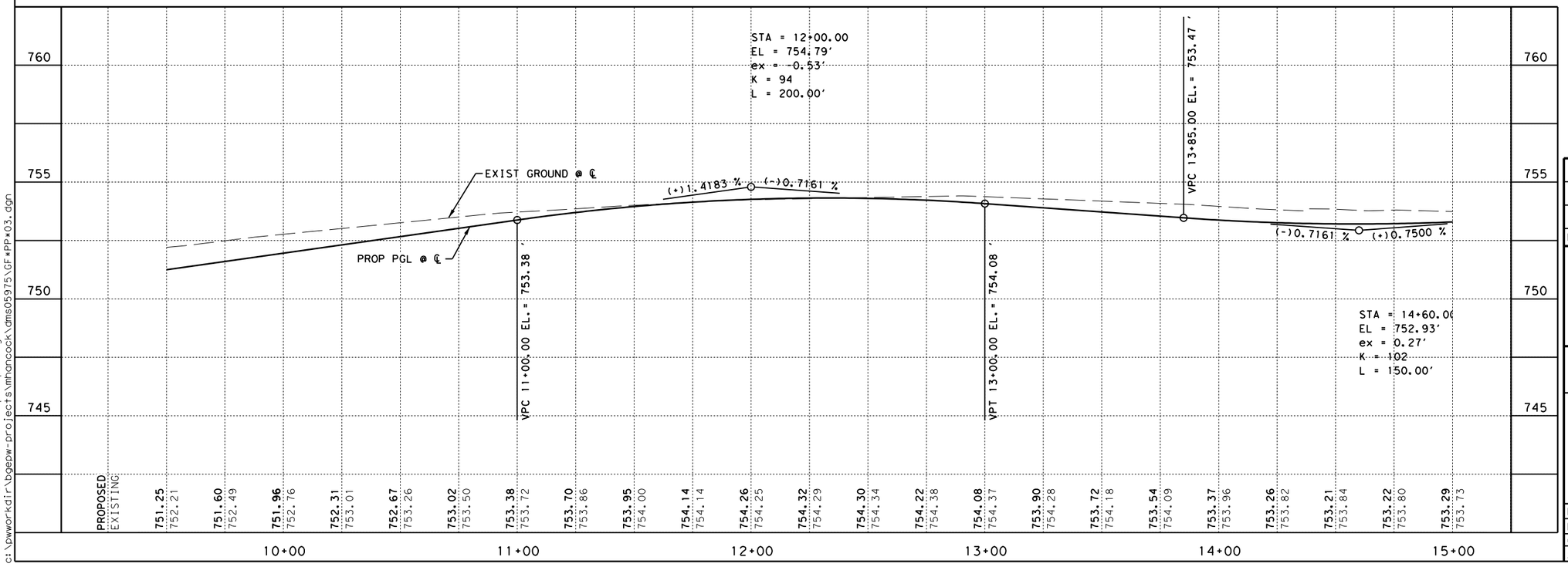
PLAN & PROFILE

(OLD GOFORTH RD)

DESIGNED BY:		SHEET 20 OF 22
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50
SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

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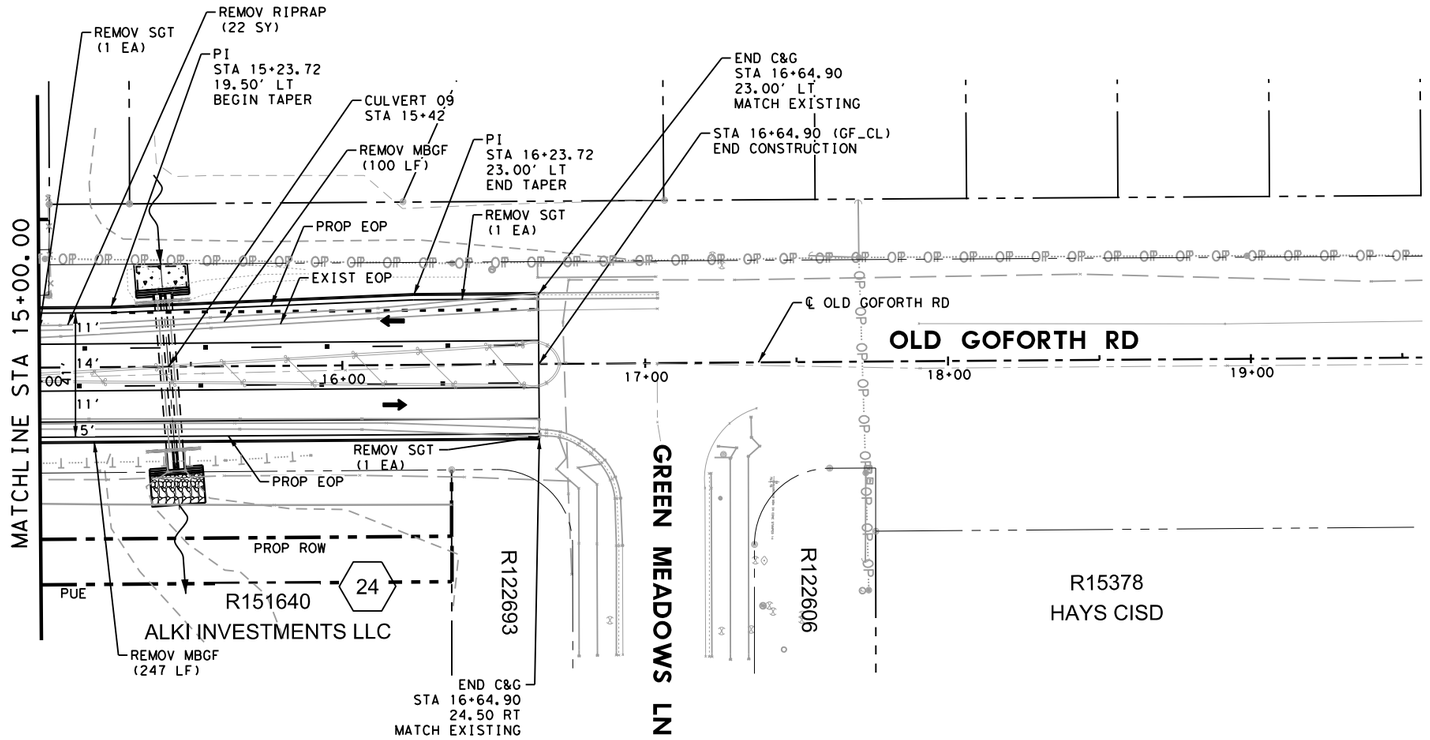
HILLSIDE TERRACE

PLAN & PROFILE

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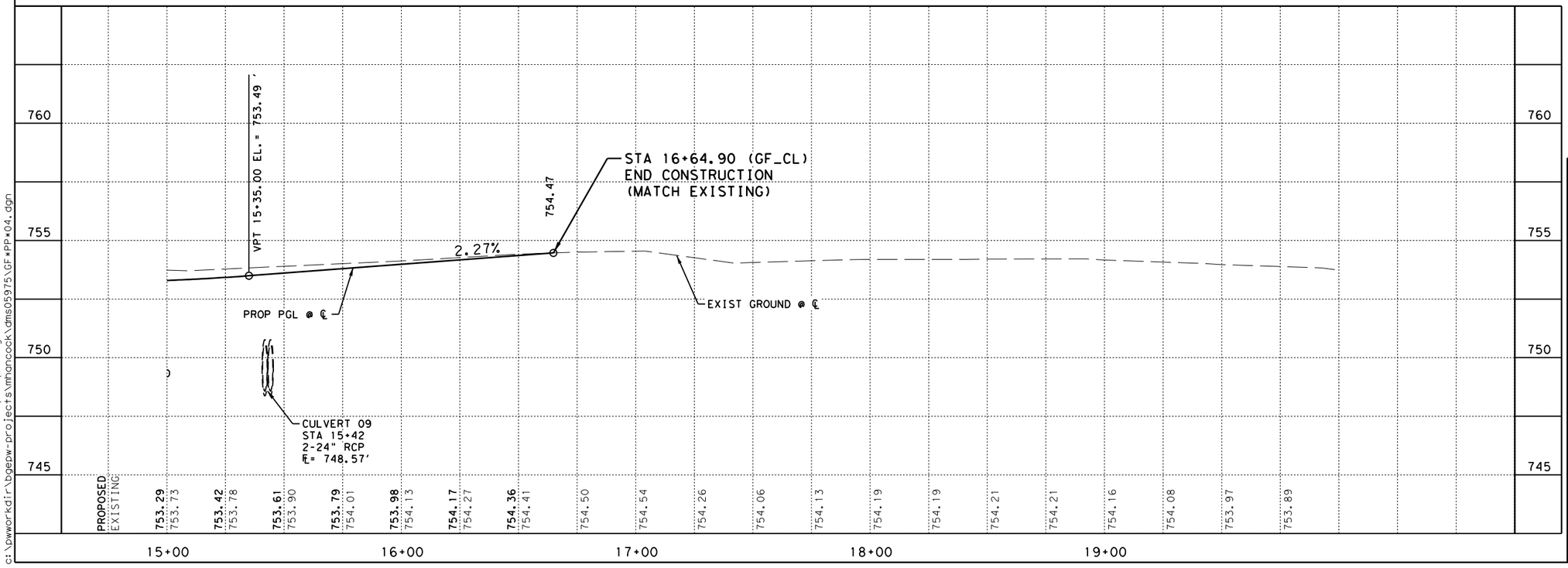
LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
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- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 25 50

SCALE: 1"=50' H
1"=5' V



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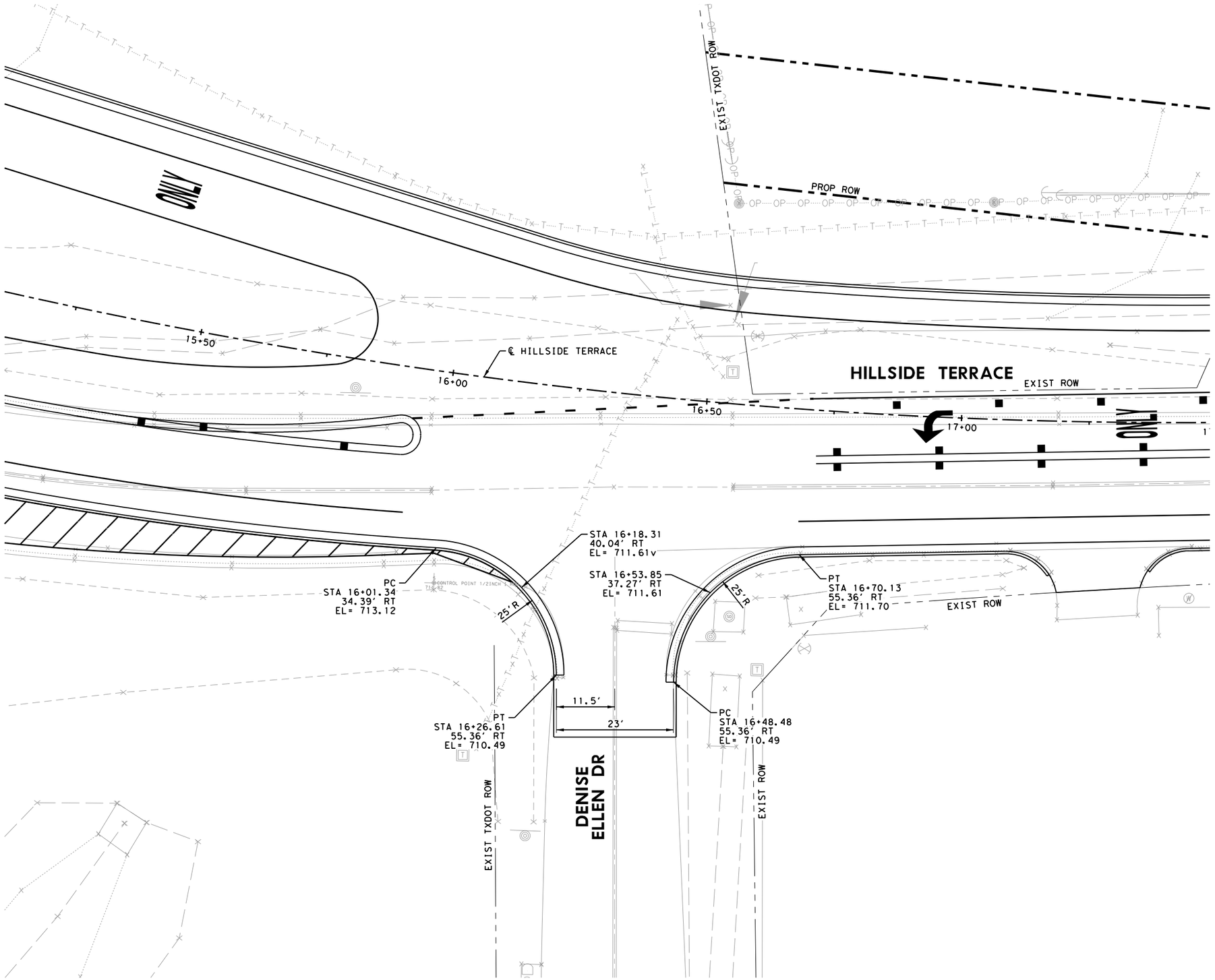
HILLSIDE TERRACE

PLAN & PROFILE

(OLD GOFORTH RD)

DESIGNED BY:		SHEET 22 OF 22
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 10 20
SCALE: 1"=20'

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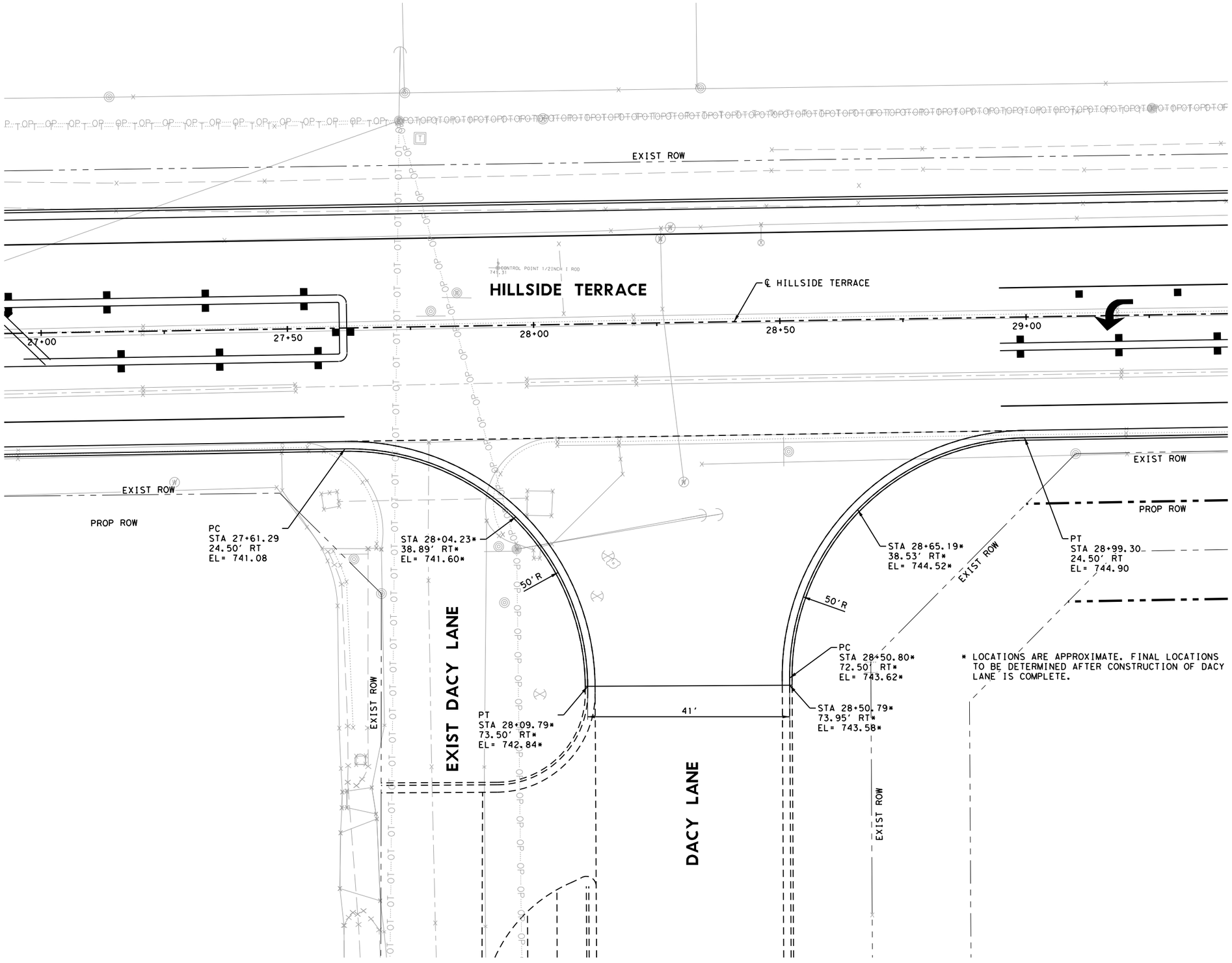
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HILLSIDE TERRACE

INTERSECTION LAYOUT DENISE ELLEN DR

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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 10 20
SCALE: 1"=20'

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* LOCATIONS ARE APPROXIMATE. FINAL LOCATIONS TO BE DETERMINED AFTER CONSTRUCTION OF DACY LANE IS COMPLETE.

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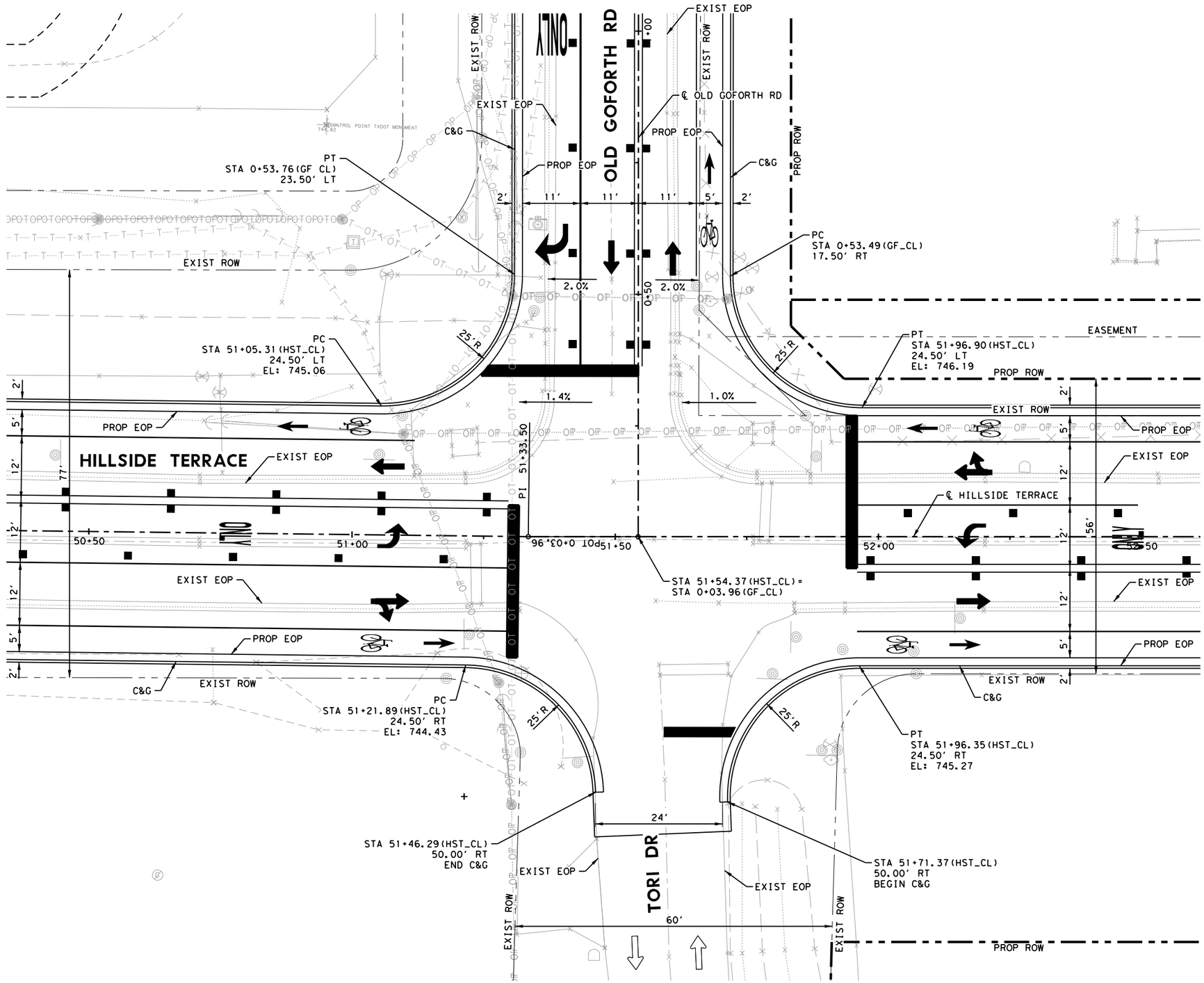
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HILLSIDE TERRACE

INTERSECTION LAYOUT DACY LANE

DESIGNED BY:		SHEET 1 OF 1
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LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- 1 PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 10 20
SCALE: 1"=20'

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HAYS COUNTY STATE OF TEXAS

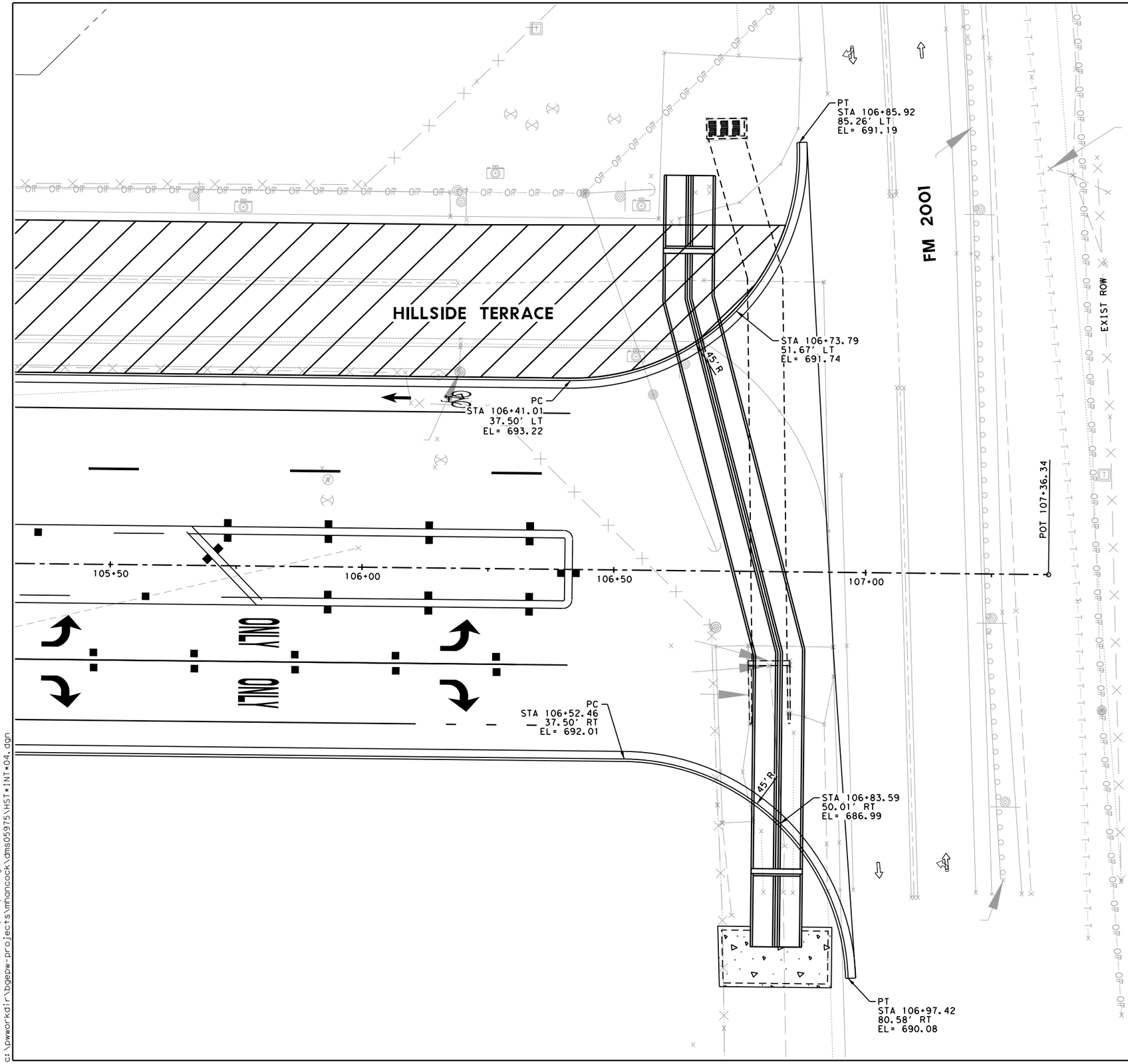
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HILLSIDE TERRACE

INTERSECTION LAYOUT OLD GOFORTH RD

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N

LEGEND:

- DIRECTION OF TRAFFIC
- DW# DRIVEWAY NUMBER
- CULVERT FLOW DIRECTION
- CURVE # ALIGNMENT CURVE NUMBER
- EXISTING ROW
- PROPOSED ROW/PUE /TEMP CONST EASEMENT
- EXISTING FENCE
- PROPOSED EDGE OF PAVEMENT
- OBLITERATE ROAD
- (1) PARCEL NUMBER

NOTE: OFFSET DIMENSIONS ARE TO THE FACE OF CURB.

0 10 20
SCALE: 1"=20'

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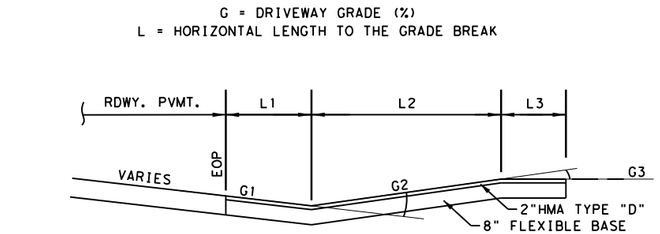
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HILLSIDE TERRACE

INTERSECTION LAYOUT FM 2001

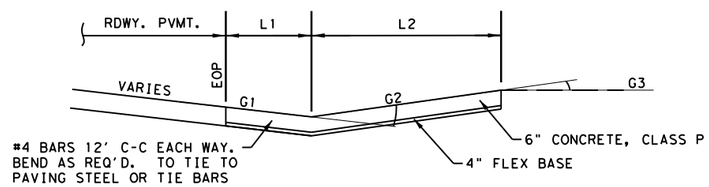
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APPROVED BY:		

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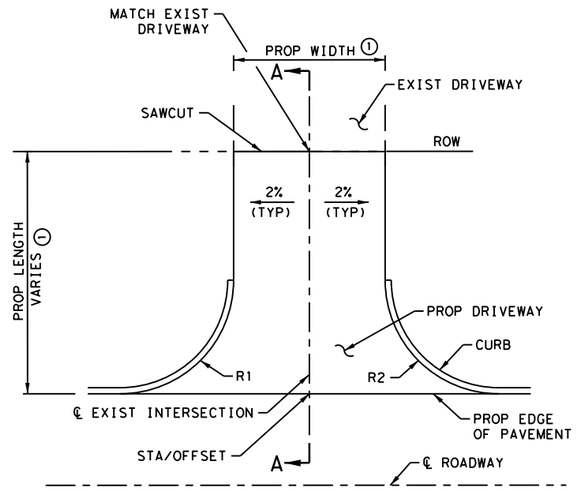
SECTION A-A

DRIVEWAYS (ACP)
NTS



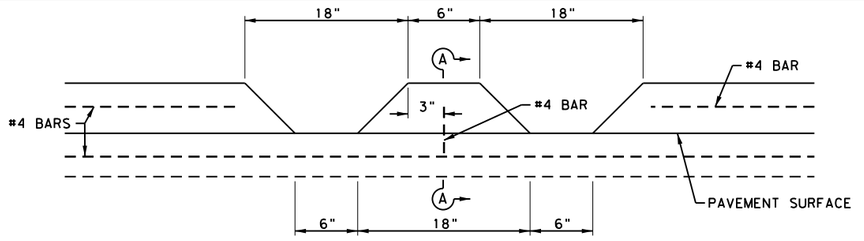
SECTION A-A

DRIVEWAYS (CONC)
NTS

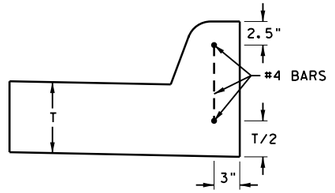


DRIVEWAYS

① FOR DRIVEWAY QUANTITIES SEE SUMMARY OF ROADWAY QUANTITIES.
FOR ADDITIONAL DETAILS AND DIMENSIONS SEE DRIVEWAY DETAILS.



PROFILE



SECTION A-A

TYPICAL SAWTOOTH CURB & GUTTER DETAIL

PAID FOR AS CURB AND GUTTER
NOT TO SCALE

INTERSECTIONS

DENISE ELLEN DR, LOVE DR, SUSAN DR & REGINA DR

① FOR INTERSECTIONS QUANTITIES SEE SUMMARY OF ROADWAY QUANTITIES.
FOR ADDITIONAL DETAILS AND DIMENSIONS SEE INTERSECTION DETAILS.

SECTION A-A

INTERSECTIONS
(IDENTICAL TO ROADWAY SECTION)

INTERSECTIONS

DACY LN (CR 205), SHELLSTONE TRL, TORI DR & GREEN MEADOWS LN.

① FOR INTERSECTIONS QUANTITIES SEE SUMMARY OF ROADWAY QUANTITIES.
FOR ADDITIONAL DETAILS AND DIMENSIONS SEE INTERSECTION DETAILS.

SECTION A-A

INTERSECTIONS
(FULL DEPTH HMA SECTION)

PRELIMINARY

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HILLSIDE TERRACE

MISCELLANEOUS DETAILS

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SUMMARY OF INTERSECTIONS																			
INTERSECTION NAME	P&P SHEET NUMBER	CENTERLINE STATION		R1 (FT)	R2 (FT)	WIDTH	LENGTHS			GRADES			CURVES				ELEV AT PROP EOP	ELEV AT TIE IN
						FT	L1 (FT)	L2 (FT)	L3 (FT)	G1 (%)	G2 (%)	G3 (%)	C1		C2			
													LENGTH (FT)	ELEVATION	LENGTH (FT)	ELEVATION		
DENISE ELLEN DR	2	16+33	RT	26.5	26.5	20	23.33	12.50		-6.00	-2.15		25.00	710.56			711.96	710.29
LOVE DR	2	19+25	RT	26.5	26.5	19	10.50	20.00	15.00	2.00	4.77	2.43	15.00	714.05	25.00	715.00	713.84	715.37
SUSAN DR	3	22+12	RT	26.5	26.5	16	5.50	17.10		2.00	7.20		10.00	721.93			721.82	723.16
REGINA DR	3	25+03	RT	26.5	26.5	18	10.50	12.91		2.00	5.50		10.00				730.98	731.90
DACY LN (CR 205)	4	28+32	RT	50	50	41	TBD*											
SHELLSTONE TRL	6	38+34	LT	26.5	26.5	24	12.75	12.25		2.00	0.50		20.00	751.78			751.53	751.85
TORI DR	8	51+59	RT	25	16.5	21	10.00	15.90	7.60	2.00	2.88	-2.11	10.00	744.61	10.00	745.07	744.41	744.91
OLD GOFORTH RD (CR 119)	8	51+57	LT	26.5	26.5	39	SEE OLD GOFORTH RD PLAN AND PROFILE FOR DETAILS											
GREEN MEADOWS LN	12	71+43	LT	26.5	26.5	27	7.50	44.00	13.70	2.00	6.01	0.50	10.00	742.45	25.00	745.09	742.30	745.16

NOTE: SEE ROADWAY SUMMARIES FOR INTERSECTION QUANTITIES

* DIMENSIONS
TO BE DETERMINED AFTER CONSTRUCTION OF DACY LANE IS COMPLETE.

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

INTERSECTION DETAILS

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		
CHECKED BY:		120
APPROVED BY:		

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SUMMARY OF DRIVEWAYS

DRIVEWAY NUMBER	P&P SHEET NUMBER	CENTERLINE STATION		REFERENCED ALIGNMENT	EXISTING SURFACE	PROPOSED SURFACE	R1 (FT)	R2 (FT)	SKEW (DEGREES)	WIDTH	AREA	LENGTHS			GRADES			DRIVEWAY TYPE	ELEV AT PROP EOP	ELEV AT TIE IN
										FT	SY	L1 (FT)	L2 (FT)	L3 (FT)	G1 (%)	G2 (%)	G3 (%)			
DW# 01	2	17+26.95	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10	10		16	21	7.91			-9.58			RESIDENTIAL	710.79	710.03
DW# 02	2	17+71.82	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10	10		21	21	6.73			4.43			RESIDENTIAL	710.82	711.12
DW# 03	2	17+77.07	LT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10.5	10.5		17	35	10.63			4.55			COMMERCIAL	710.85	711.33
DW# 04	2	18+82.09	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10	6		16	19	12.82			9.11			RESIDENTIAL	712.61	713.78
DW# 05	2	20+69.62	RT	HILLSIDE TERRACE	GRAVEL	ASPHALT	10	10		17	14	6.19			6.33			RESIDENTIAL	717.85	718.24
DW# 06	3	23+67.35	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	6.5	6.5		13	12	5.50			9.40			RESIDENTIAL	726.27	726.79
DW# 07	4	26+72.49	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	6.5	6.5		14	23	8.40			-2.12			RESIDENTIAL	737.43	737.25
DW# 08	4	30+76.96	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	3	4		19	55							RESIDENTIAL		
DW# 09	5	32+28.49	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	5	6		14	28							RESIDENTIAL		
DW# 10	5	35+23.01	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		23	26	8.43			-6.70			RESIDENTIAL	749.53	748.96
DW# 10B*	6	38+03.32	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		17	95							RESIDENTIAL		
DW# 10C*	6	39+07.70	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		15	85							RESIDENTIAL		
DW# 10D*	6	40+77.40	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	20.5	20.5		16	105							COMMERCIAL		
DW# 11	8	52+81.11	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	9.5	9.5		11	20	10.00	2.42		7.00	-0.66		RESIDENTIAL	644.69	743.37
DW# 12	9	54+99.74	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	7.5	10.5		17	18	7.74			2.59			RESIDENTIAL	738.61	738.81
DW# 13	9	57+51.87	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	9.5	9.5	1.3	10	41							RESIDENTIAL		
DW# 13A*	9	58+31.83	RT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10.5	10.5		20	155							RESIDENTIAL		
DW# 14	10	62+42.57	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	9.5	9.5		14	37							RESIDENTIAL		
DW# 15	11	69+05.61	LT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10.5	10.5		12	56	32.62	5.70		2.00	4.00		COMMERCIAL	726.47	727.35
DW# 16	12	75+17.18	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5	3.8	9	48	43.52			6.44			RESIDENTIAL	771.06	773.86
DW# 17	13	77+34.30	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5	3	9	46	7.39	35.43		-2.00	-9.00		RESIDENTIAL	783.26	782.82
DW# 18	13	78+02.11	LT	HILLSIDE TERRACE	GRAVEL	ASPHALT	10.5	10.5		17	65	28.03	4.36		-2.00	2.87		RESIDENTIAL	783.26	782.82
DW# 19	13	78+77.44	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5	2.8	10	53	42.50			-11.62			RESIDENTIAL	784.36	779.42
DW# 20	13	79+74.88	LT	HILLSIDE TERRACE	GRAVEL	ASPHALT	10.5	10.5		37	140	8.50	18.80	5.20	-2.00	-2.87	1.50	COMMERCIAL	784.42	783.79
DW# 21	13	80+66.98	LT	HILLSIDE TERRACE	GRAVEL	ASPHALT	10.5	10.5		22	83	5.50	17.96	9.00	-2.00	-3.43	1.52	COMMERCIAL	784.10	783.51
DW# 22	14	82+91.59	RT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5	2.6	10	52	5.50	27.00	9.91	-2.00	-4.82	-2.61	RESIDENTIAL	783.20	781.64
DW# 23	14	85+59.46	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		23	102	5.50	27.51		-2.00	-8.30		COMMERCIAL	786.36	783.97
DW# 24	15	87+47.50	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		25	88	22.80	7.12		-2.00	5.00		COMMERCIAL	792.27	792.17
DW# 25	OMITTED																			
DW# 26	15	90+80.45	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		20	96	36.36			11.64			RESIDENTIAL	793.70	797.93
DW# 27	15	91+81.26	LT	HILLSIDE TERRACE	NATURAL GROUND	ASPHALT	10.5	10.5		22	90	35.00			9.76			COMMERCIAL	790.55	793.97
DW# 28	16	94+55.70	LT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10.5	10.5		19	79	35.40			4.36			COMMERCIAL	776.67	778.21
DW# 29	16	96+17.65	LT	HILLSIDE TERRACE	CONCRETE	CONCRETE	10.5	10.5		45	161	12.50	18.93		-2.00	0.67		COMMERCIAL	770.75	770.63
DW# 30	16	96+82.36	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		34	124	31.54			1.68			COMMERCIAL	768.30	768.83
DW# 31	16	97+96.97	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		17	75	37.30			6.84			COMMERCIAL	762.37	764.92
DW# 32	OMITTED																			
DW# 32A*	17	100+47.44	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		15	105							RESIDENTIAL		
DW# 32B*	17	102+86.40	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		15	105							RESIDENTIAL		
DW# 33	17	103+13.80	RT	HILLSIDE TERRACE	NATURAL GROUND	ASPHALT	10.5	10.5		15	68	31.84	5.53		7.97	-0.50		RESIDENTIAL	716.82	718.58
DW# 34	OMITTED																			
DW# 34A*	18	104+43.35	LT	HILLSIDE TERRACE	ASPHALT	ASPHALT	10.5	10.5		15	105							RESIDENTIAL		
DW# 35	19	3+35.82	RT	OLD GOFORTH	NATURAL GROUND	ASPHALT	10	10		14	23	19.50			-12.00			RESIDENTIAL	745.75	743.41
DW# 36	20	8+36.30	RT	OLD GOFORTH	CONCRETE	CONCRETE	10	10		44	106							COMMERCIAL		
DW# 37	21	11+31.98	RT	OLD GOFORTH	CONCRETE	CONCRETE	10	10		40	96	20.50			-1.64			COMMERCIAL	752.90	752.56
DW# 38	21	13+33.21	RT	OLD GOFORTH	CONCRETE	CONCRETE	10	10		40	96	20.46			-1.56			COMMERCIAL	752.79	752.47
DW# 39	21	14+22.37	LT	OLD GOFORTH	NATURAL GROUND	ASPHALT	10	10		10	21	14.35			6.95			RESIDENTIAL	752.86	753.86

* DRIVEWAY WILL BE REMOVED FROM PLANS BY THE TIME THIS PROJECT GOES TO CONSTRUCTION.

NO.	DATE	REVISION	APPROVED

HAYS COUNTY, STATE OF TEXAS

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

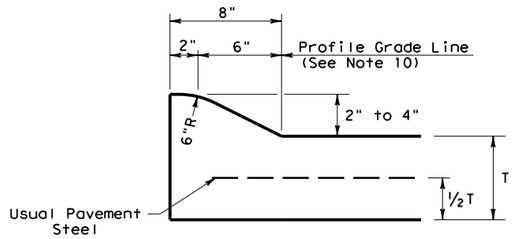
DRIVEWAY DETAILS

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		121
CHECKED BY:		
APPROVED BY:		

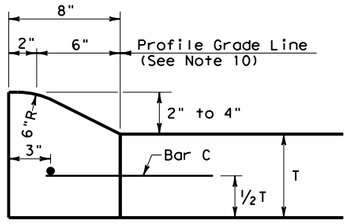
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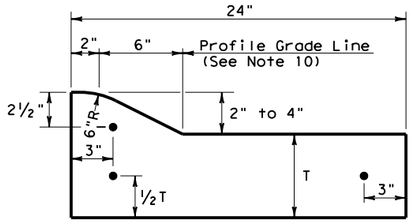
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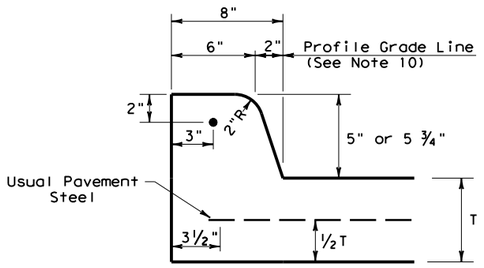
TYPE I CURB (MONOLITHIC)
2" - 4" HEIGHT



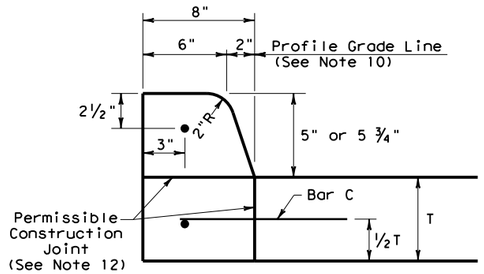
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2" - 4" HEIGHT



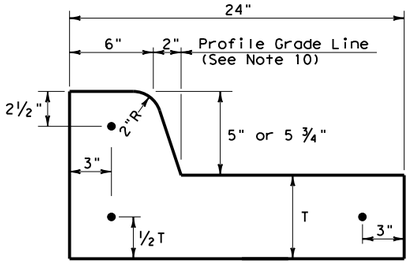
TYPE I CURB AND GUTTER
2" - 4" HEIGHT



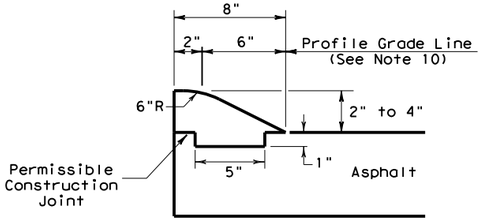
TYPE II CURB (MONOLITHIC)
5" - 5 ¾" HEIGHT



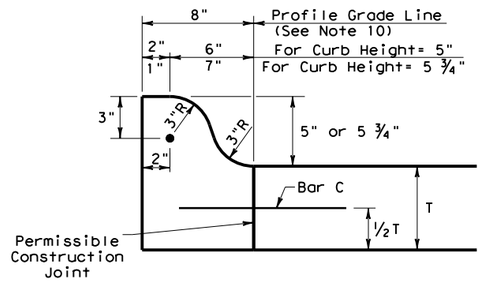
TYPE II CURB
5" - 5 ¾" HEIGHT



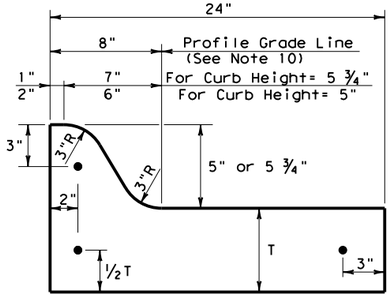
TYPE II CURB AND GUTTER
5" - 5 ¾" HEIGHT



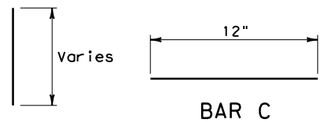
TYPE III CURB (KEYED)
2" - 4" HEIGHT



TYPE IIa CURB
5" - 5 ¾" HEIGHT

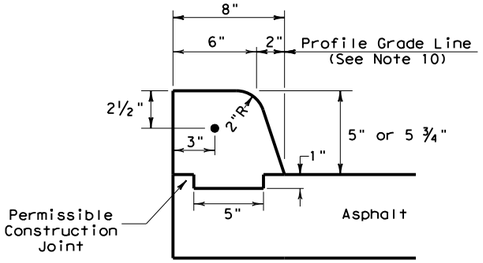


TYPE IIa CURB AND GUTTER
5" - 5 ¾" HEIGHT

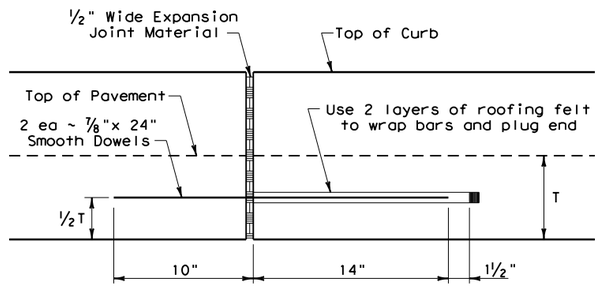


BAR B

BAR C

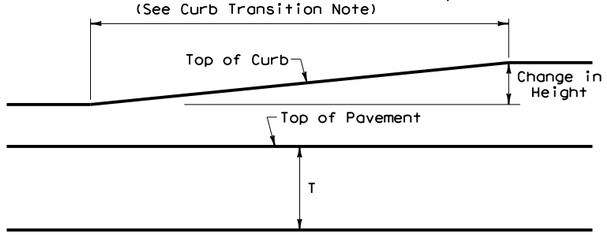


TYPE IV CURB (KEYED)
5" - 5 ¾" HEIGHT



EXPANSION JOINT DETAIL

CURB TRANSITION NOTE:
Field conditions may require a longer or shorter transition, and shall be shown elsewhere in the plans, or as directed by the Engineer.



CURB TRANSITION
Note: To be paid for as Highest Curb

GENERAL NOTES

1. All materials and construction shall be in accordance with Item 529, "Concrete Curb, Gutter, and Combined Curb and Gutter."
2. Concrete shall be Class A.
3. When reinforcing bars are used, they shall be No.4 unless otherwise shown. The use of fiber reinforced concrete in lieu of reinforcing steel is acceptable. Use fibers meeting the requirements of DMS 4550, "Fibers for Concrete," and dose fibers in accordance with Material Producers List (MPL) "Fibers for Class A and B Concrete Applications."
4. Round exposed sharp edges with a rounding tool, to a minimum radius of ¼ inch.
5. All existing curbs and driveways to be removed shall be sawed or removed at existing joints.
6. Where concrete curb is to be placed on existing concrete pavement, Bar B may be drilled and the grouted in place, or may be inserted into fresh concrete.
7. Expansion and contraction joints shall be constructed to match pavement joints in all curbs and curb and gutter adjacent to jointed concrete pavement. Where placement of curb or curb and gutter is not adjacent to concrete pavement, expansion joints shall be provided at structures, curb returns at streets, and at locations directed by The Engineer.
8. Vertical and horizontal dowel bars and transverse reinforcing bars shall be placed at four feet C~C.
9. Dimension 'T' shown is the thickness of concrete pavement. When curb is installed adjacent to flexible pavement dimension 'T' is 8" maximum.
10. Usual profile grade line. Refer to typical sections and plan-profile sheets for exact locations.
11. One-half inch expansion joint material shall be provided where curb or curb and gutter is adjacent to sidewalk or riprap.
12. When horizontal permissible construction joints are used, the longitudinal pavement steel shall be placed in accordance with pavement details shown elsewhere in the plans. Reinforcing steel for curb section shall then conform to that required for concrete curb.
13. Bar B used as needed to support curb reinforcing steel during concrete placement.

Texas Department of Transportation

Design Division Standard

CONCRETE CURB AND CURB AND GUTTER

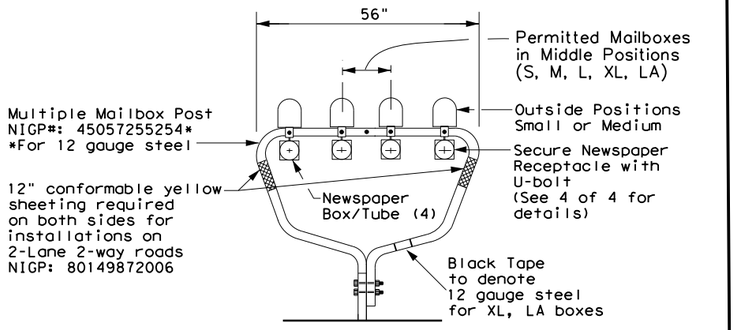
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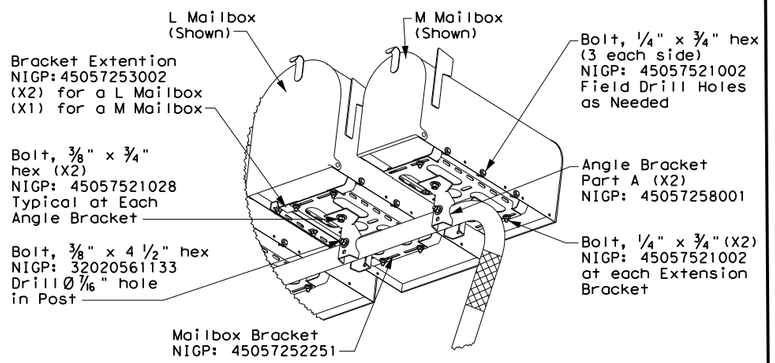
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©TxDOT: FEBRUARY 2021	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		122

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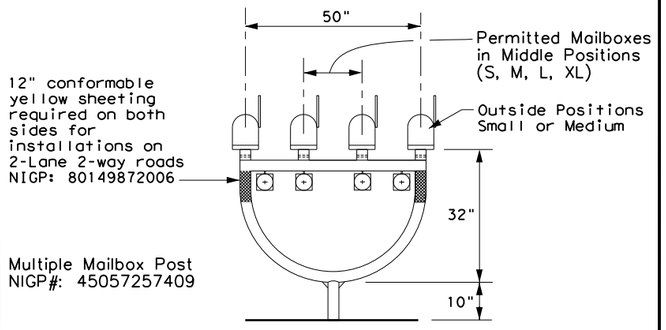
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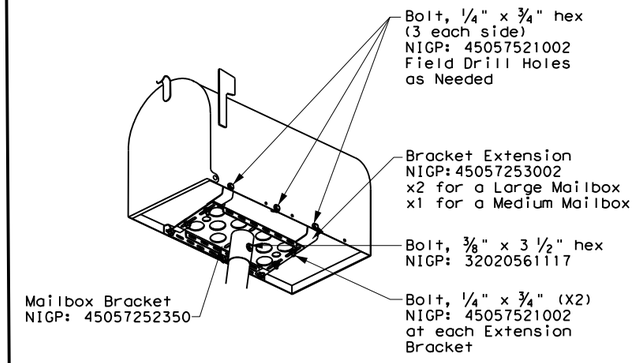
TYPE 1 - MULTIPLE





TYPE 4 - MULTIPLE





MAILBOX SIZES

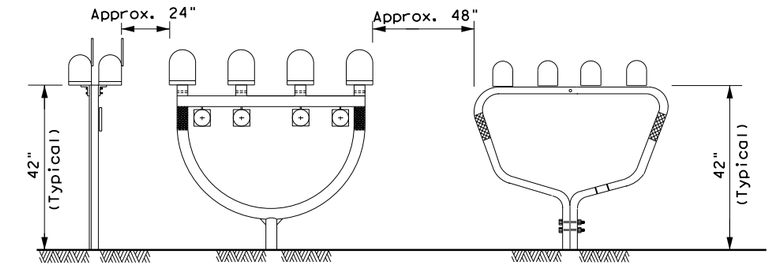
MAILBOX SIZE	TYPICAL DIMENSIONS			MAX **
	LENGTH	WIDTH	HEIGHT	WEIGHT
SMALL	19 1/2"	6"	7"	6 LBS
MEDIUM	22 1/2" *	8" *	11 1/2" *	8 LBS
LARGE	23 1/2"	11 1/2"	13 1/2"	11 LBS
EXTRA LARGE	18"	14"	12"	13 LBS
LOCKABLE	18"	11 1/2"	15"	23 LBS

* See Note 1.
** Excluding Molded Plastic on 4 X 4 Post

GENERAL NOTES:

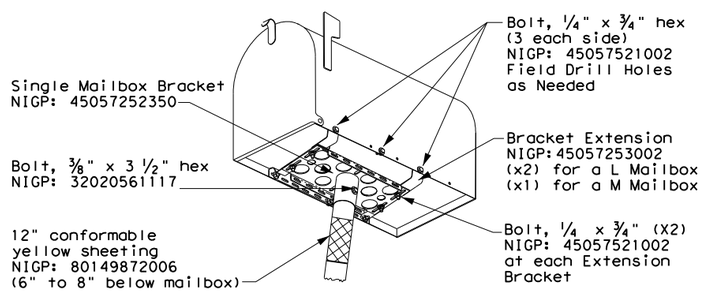
1. Dimensions shown (length, width, and height) are typical, not maximums. However, anytime a medium size mailbox is mounted on a single/double mount or on the outside position on a multi mount, the dimensions shown are maximums.
2. Mailboxes shall be made of light weight sheet metal or light weight plastic. Heavy steel, cast iron or decorative mailboxes shall not be used on the state highway system.

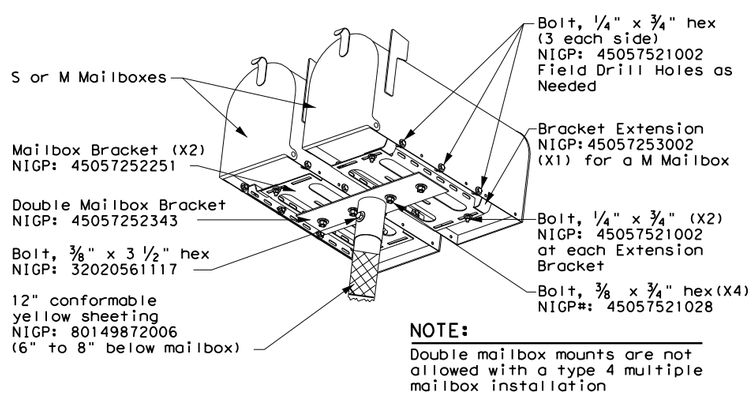
TYPICAL INSTALLATION MEASUREMENTS



NOTE:
Mailbox installations in sidewalk areas shall be in accordance with the latest TxDOT Design Standard sheets PED-Pedestrian Facilities Curb Ramps.

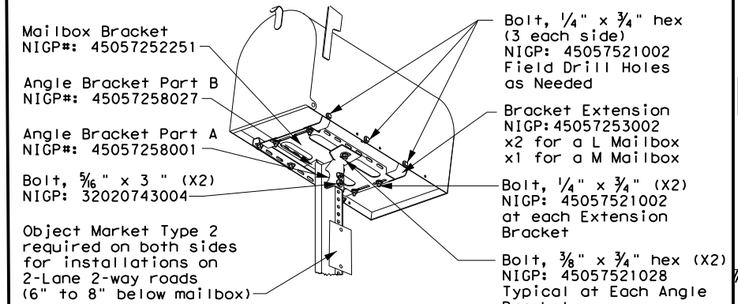
TYPE 2 and 4 - SINGLE/DOUBLE

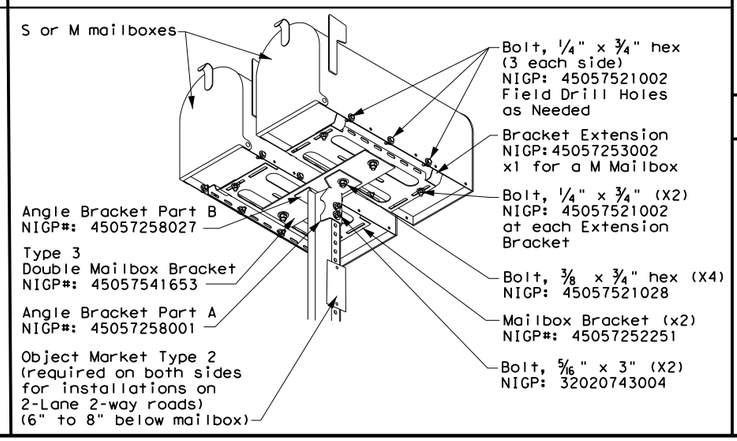




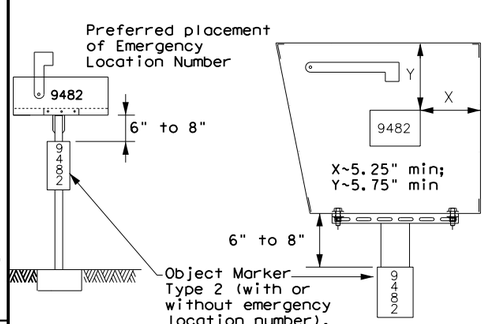
NOTE:
Double mailbox mounts are not allowed with a type 4 multiple mailbox installation

TYPE 3 - SINGLE/DOUBLE





PLACEMENT OF EMERGENCY LOCATION NUMBER

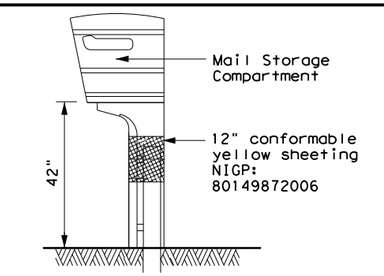


NOTES:

1. Location numbers are provided by homeowner. Minimum size 1" height.
2. Location number is typically placed on the mailbox in a contrasting color.
3. Black numbers may be placed on the Type 2 object marker if the numbers cannot be placed on the mailbox.
4. Alternatively, a green or blue plate with white numbers attached may be mounted below the object marker. Other contrasting color configuration, as approved, may be used.
5. See 3 of 4 for Foundation details.
6. See 4 of 4 for Hardware details.

SHEET 1 OF 4

TYPE 5



Typical Molded Plastic Mailbox

Texas Department of Transportation
Maintenance Division Standard

MAILBOX MOUNTING AND ASSEMBLY

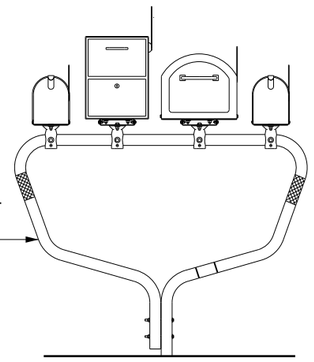
MB(1)-21

FILE: MB-21.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO. 123

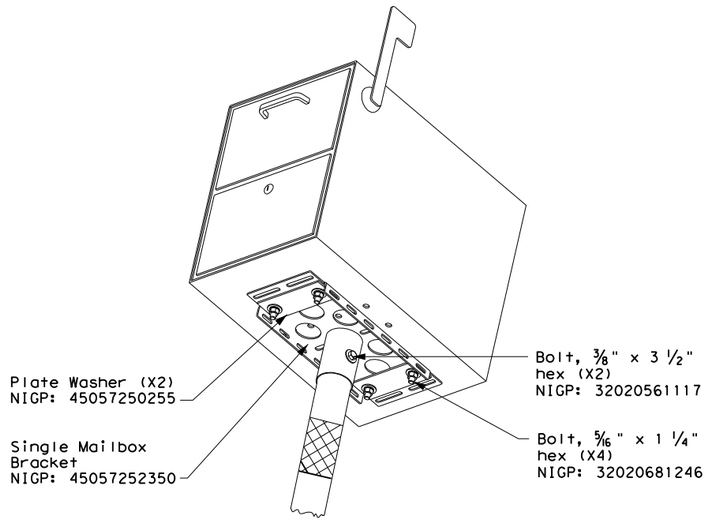
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DATE:
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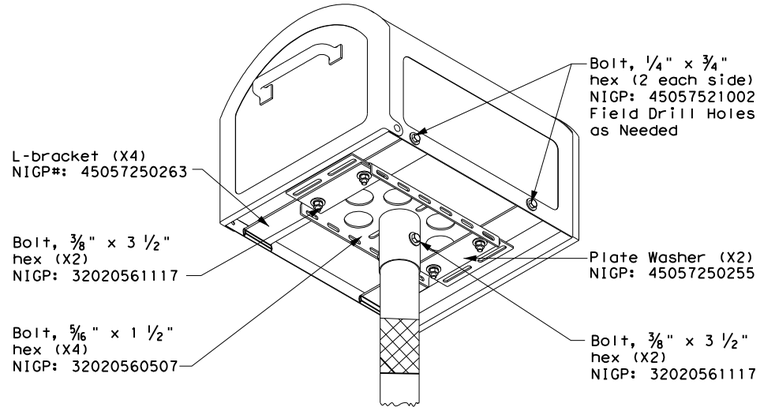
TYPE 1- MULTI LOCKABLE AND XL MAILBOX



TYPE 2/4 - SINGLE LOCKABLE MAILBOX

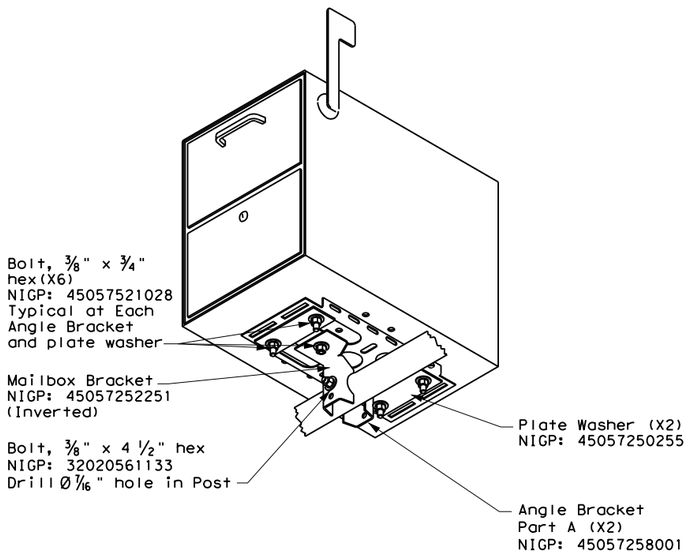


TYPE 2/4 - SINGLE XL MAILBOX

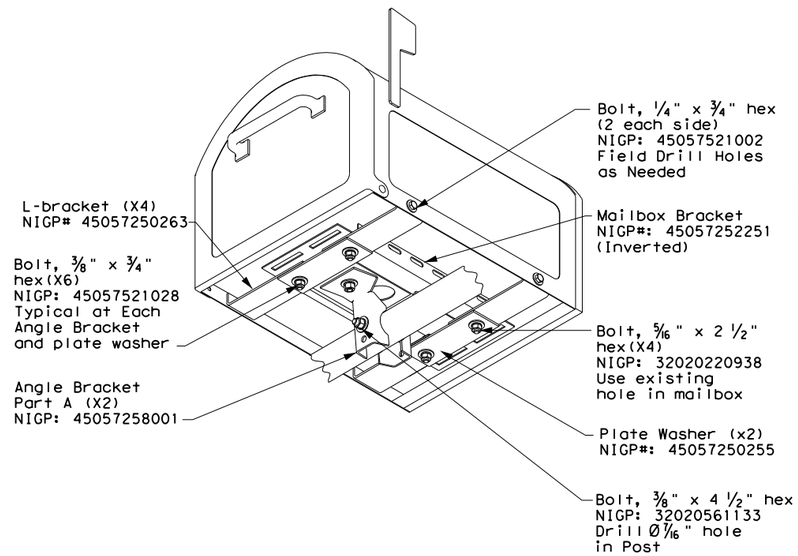


NOTE:
Follow same configuration when mounting an XL mailbox on a Type 4 multi post.

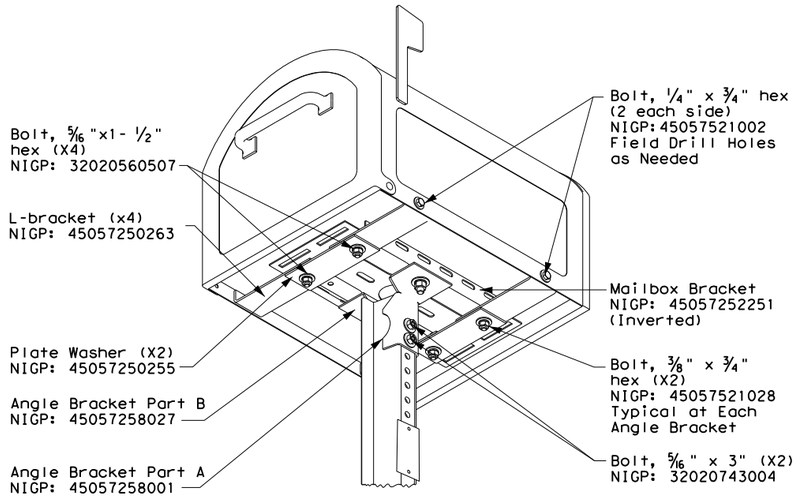
TYPE 1 MULTI – LOCKABLE ARCHITECTURAL (LA)



TYPE 1 MULTI – XL MAILBOX



TYPE 3 - XL MAILBOX MOUNTING



Texas Department of Transportation | Maintenance Division Standard

XL AND LOCKABLE ARCHITECTURAL MAILBOX ASSEMBLY

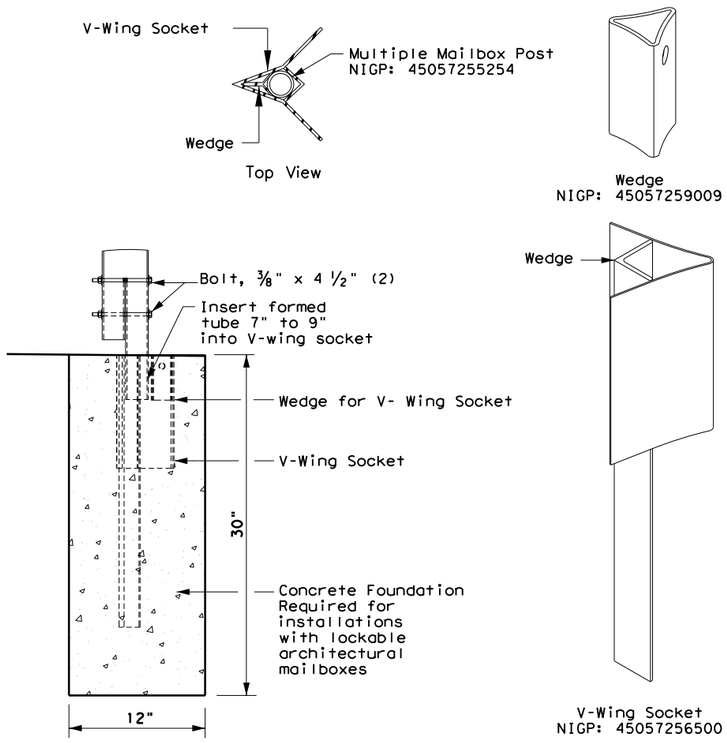
MB(2)-21

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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014	DIST	COUNTY		SHEET NO. 124

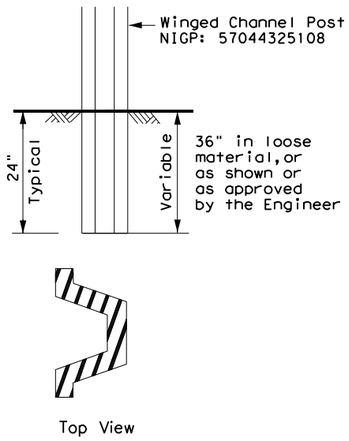
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TYPE 1 - SUPPORT/FOUNDATION

Thin Wall Tube w/ V-LOC Anchorage



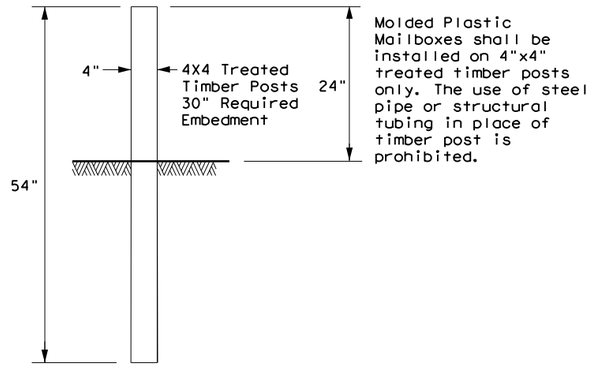
TYPE 3 - SUPPORT/FOUNDATION



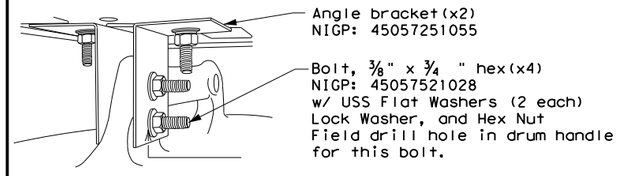
NOTES:

1. Attach Object Marker (OM) facing direction of traffic.
2. OM will also be required on opposite side if installed on a 2-Lane, 2-Way roadway.

TYPE 5 - SUPPORT/FOUNDATION



TYPE 6 - TEMPORARY MAILBOX SUPPORT



Plastic Drum NIGP: 55093383655
Rubber Collar NIGP: 55093387102

NOTES:

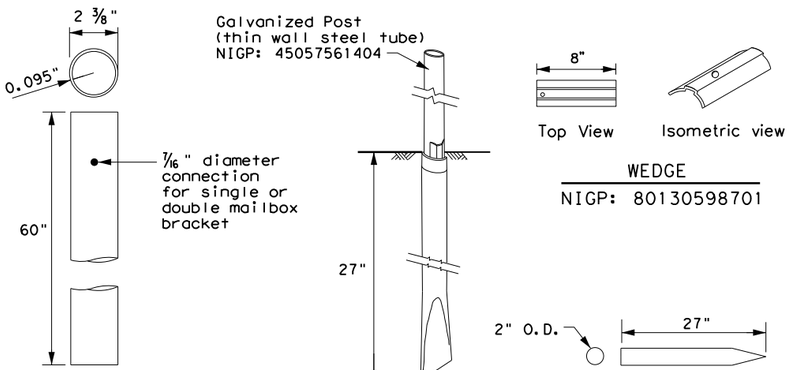
1. Place on approved plastic drum as shown in the Compliant Work Zone Traffic Control Devices (CWZTCD).
2. Existing attachment hardware shall be used unless damaged. Damaged hardware shall be replaced.

GENERAL NOTES:

1. Erect post plumb or vertical.
2. When galvanized part is required galvanize in accordance with Item 445.
3. Use a concrete footing as shown or when directed. Concrete footing will be required when soils do not hold the support/foundations in a stable condition, only on Type 1, Type 2, and Type 4

TYPE 2 - SUPPORT/FOUNDATION

Thin Wall Steel Tube w/Wedge Anchor System

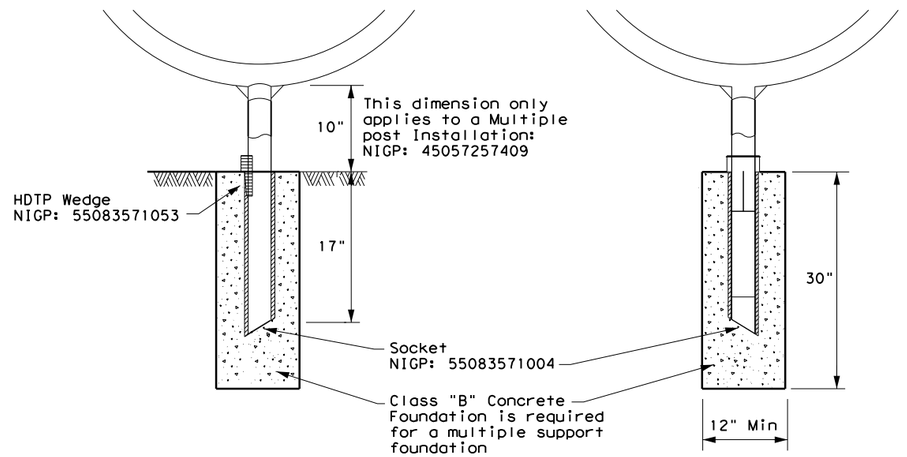


MAILBOX POST

WEDGE ANCHOR
NIGP: 80130238407

TYPE 4 - SUPPORT/FOUNDATION

Whitecoated steel post NIGP: 45057561107
Multiple post NIGP: 45057257409
Recycled Rubber post (RR) NIGP: 45057561057



SHEET 3 OF 4

Texas Department of Transportation

Maintenance Division Standard

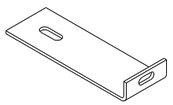
MAILBOX SUPPORT AND FOUNDATION

MB(3)-21

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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		125

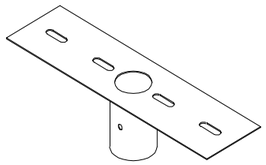
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FILE: c:\projects\mb-21.dgn

TYPE	TYPE 1	TYPE 2	TYPE 3	TYPE 4			TYPE 5	TYPE 6
Configuration	Multiple	Single or Double	Single or Double	Single	Double	Multiple	Single	Single
Mailbox Size NIGP #	Outside Position: S or M Inside Position: S, M, L, XL, or LA	Single: S, M, L, XL, or LA Double: SS, SM, MM	Single: S, M, L, or XL Double: SS, SM, MM	S, M, L, XL, or LA	SS, SM, or MM	Outside Position: S or M Inside Position: S, M, L, or XL	Molded Plastic	S, or M
Mailbox Post NIGP #	45057255254 (Galvanized Multiple)	45057561404 (Thin Walled Gavanize)	57044325108 (Wing Channel Post)	45057561107 (Thin walled white powder coated) 45057561057 (Recycled Rubber Post: S or M only)	45057561107 (Thin Walled White Powder Coated)	45057257409 (White Powder Coated Multiple)	4x4 Timber	Construction Barrel
Post and Mailbox Hardware NIGP #	45057259009 (Wedge) 45057256500 (V-Wing Socket) 45057253002 (Bracket Extension) 45057252251 (Mailbox Bracket) 45057258001 (Part A Angle Bracket x2) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	80130598701 (Wedge) 80130238407 (Wedge Anchor) 45057253002 (Bracket Extension) 45057252343 (Double MB Bracket) 45057252350 (S. Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket forXL x4)	45057541653 (Type 3 Double Mailbox Bracket) 45057252251 (Mailbox Bracket) 45057253002 (Bracket Extension) 45057258001 (Part A Angle Bracket) 45057258027 (Part B Angle Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057252350 (Single Mailbox Bracket) 45057253002 (Bracket Extension) 45057250255 (Plate Washer for XL/LA x2) 45057250263 (L-Bracket for XL x4)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252343 (Double Mount Bracket) 45057252251 (Mailbox Bracket x2)	55083571053 (Wedge) 55083571004 (Socket) 45057253002 (Bracket Extension) 45057252350 (Single Mount Bracket) 45057250255 (Plate Washer for XL x2) 45057250263 (L-Bracket for XL x4)	None	45057251055 Angle Bracket (x2)
Foundation Used	Class B Concrete (Required for LA Mailboxes)	Class B Concrete (Required for LA Mailboxes)	None	Class B Concrete (not used with recycled rubber post, required for LA Mailboxes)	Class B Concrete (not required)	Class B Concrete	None	None



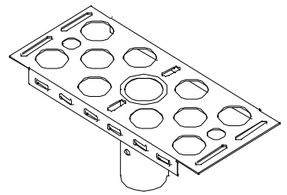
NIGP: 45057250263

L-Bracket x4 for
XL sized mailboxes



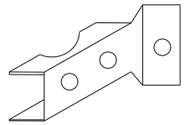
NIGP: 45057252343

Double Mailbox Bracket
For Type 2 and Type 4
double mount



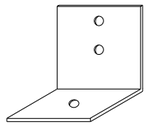
NIGP: 45057252350

Single Mailbox Bracket
For Type 2 single and for
Type 4 single and multi mount



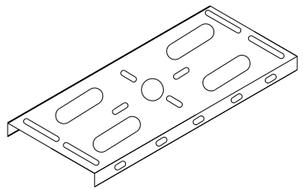
NIGP: 45057258001

Part "A" Angle Bracket
For Type 1 multi (2 per mailbox)
and Type 3 single and double



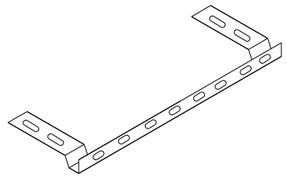
NIGP: 45057251055

Type 6 Angle Bracket
(2 per mailbox)



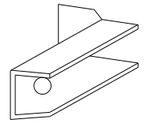
NIGP: 45057252251

Mailbox Bracket
For Type 1 multi and
any double mount (use 2)



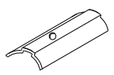
NIGP: 45057253002

Bracket Extension
Use 1 for a medium Mailbox
Use 2 for a Large Mailbox



NIGP: 45057258027

Part "B" Angle Bracket
For Type 3 single
and double



NIGP: 80130598701

Wedge for Type 2



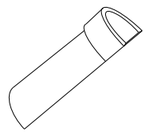
NIGP: 45057250255

Plate Washer for Architecural
and XL Mailboxes



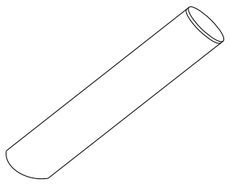
NIGP: 45057541653

Type 3 double mailbox bracket



NIGP: 55083571053

Type 4 Mailbox Wedge



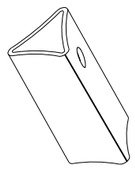
NIGP: 55083571004

Type 4 Mailbox Socket



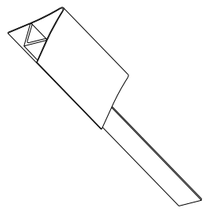
NIGP: 80130238407

Type 2 Wedge Anchor



NIGP: 45057259009

Wedge for Type 1 V-wing Socket



NIGP: 45057256500

V-wing Socket for
Type 1 Foundation

NIGP #	OBJECT MARKERS AND CONFORMABLE SHEETING
55008311759	Type 2 OM 4"x4" (3 Needed) for Type 3 Wing Channel Post
55008312906	Type 2 OM 6"x12" (1 needed) for Type 3 Wing Channel Post
80149872006	12" Conformable Reflective Yellow Sheeting for Flexible Posts

NOTES:

1. Type 2 object marker in accordance with Traffic Engineering Standard Delineators & Object Markers.
2. A light weight receptacle for newspaper delivery can be attached to mailbox posts if the receptacle does not touch the mailbox, present a hazard to traffic or delivery of the mail, extend beyond the front of the mailbox, or display advertising, except the publication title.

BID CODES FOR CONTRACTS

MB-(X) ASSM TY (XXX) (X)

Type of Mailbox
- S = Single
- D = Double
- M = Multiple
- MP = Molded Plastic

Type of Post
- WC = Winged Channel Post
- RR = Recycled Rubber
- TWW = Thin Walled White Tubing
- TWG = Thin Walled Galvanized Tubing
- TIM = Timber

Type of Foundation
- Ty 1 = V-Loc
- Ty 2 = Wedge Anchor Steel System
- Ty 3 = Winged Channel post
- Ty 4 = Wedge Anchor Plastic System
- Ty 5 = 4 X 4 Post

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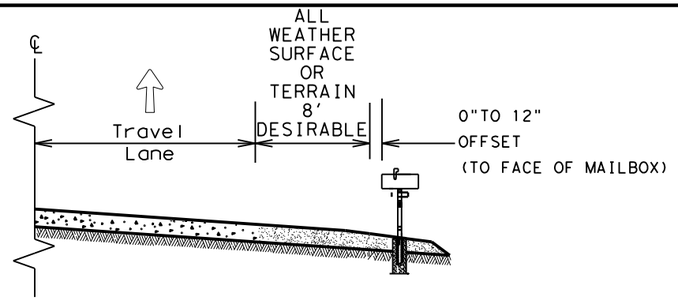
Texas Department of Transportation — Maintenance Division Standard

NIGP PARTS LIST AND COMPATIBILITY

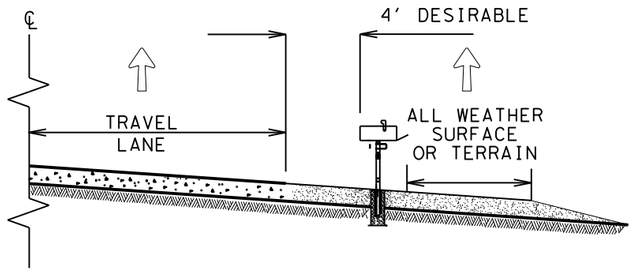
MB(4)-21

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© TxDOT March 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS 2/2005 11/2009 4/2015 6/2005 1/2011 11/2006 7/2014				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		126

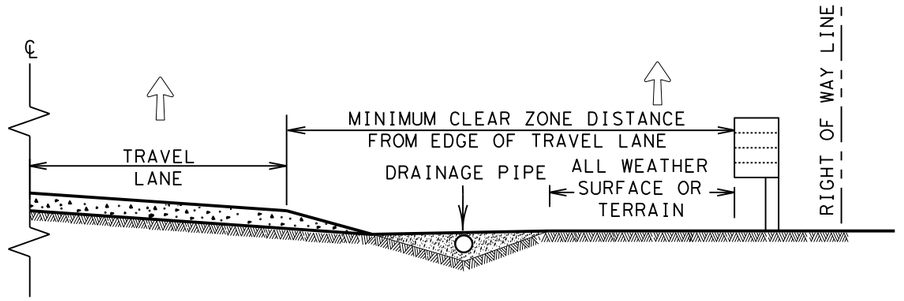
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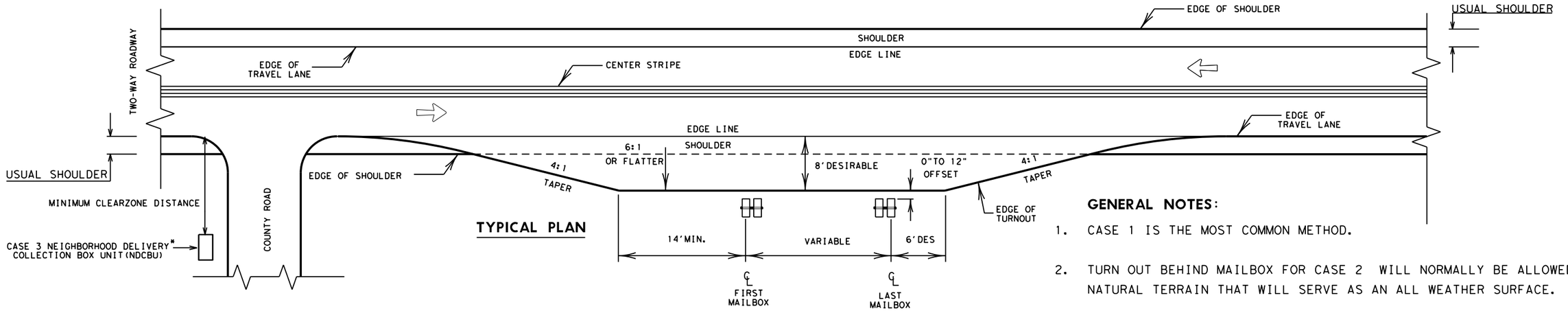
CASE 1. OFF TRAVEL WAY DELIVERY



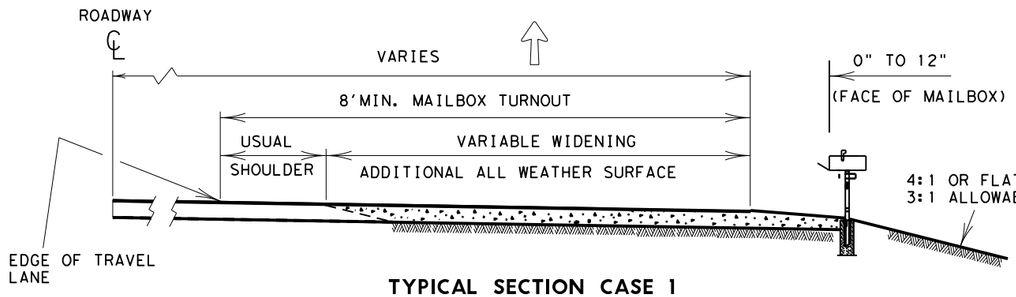
CASE 2. BACK SIDE DELIVERY



CASE 3. DELIVERY NEAR RIGHT OF WAY LINE



TYPICAL PLAN



TYPICAL SECTION CASE 1

GENERAL NOTES:

1. CASE 1 IS THE MOST COMMON METHOD.
2. TURN OUT BEHIND MAILBOX FOR CASE 2 WILL NORMALLY BE ALLOWED FOR NATURAL TERRAIN THAT WILL SERVE AS AN ALL WEATHER SURFACE.
3. ALL WEATHER DRIVEWAYS FOR CASE 3 MAILBOXES LOCATED AT THE RIGHT OF WAY LINE SHOULD NORMALLY BE PLACED IN CONJUNCTION WITH COUNTY ROADS OR OTHER CONNECTING COMMUNITY ROADS OR STREETS. WHEN 3 OR MORE MULTI-RACKS ARE ANTICIPATED, THE USE OF AN NDCBU IS RECOMMENDED. ONLY RURAL PATRONS LOCATED ON STATE MAINTAINED HIGHWAYS MAY HAVE A MAILBOX OR NDCBU SLOT ON TXDOT RIGHT OF WAY.

*NDCBU MAY BE INSTALLED ON COUNTY ROAD ROW WITH APPROVAL OF COUNTY.

MAIL DELIVERY VEHICLE TRAVEL DIRECTION

Texas Department of Transportation | Maintenance Division Standard

Guideline

MAILBOX SIDE ROAD PLACEMENT AND TURNOUTS

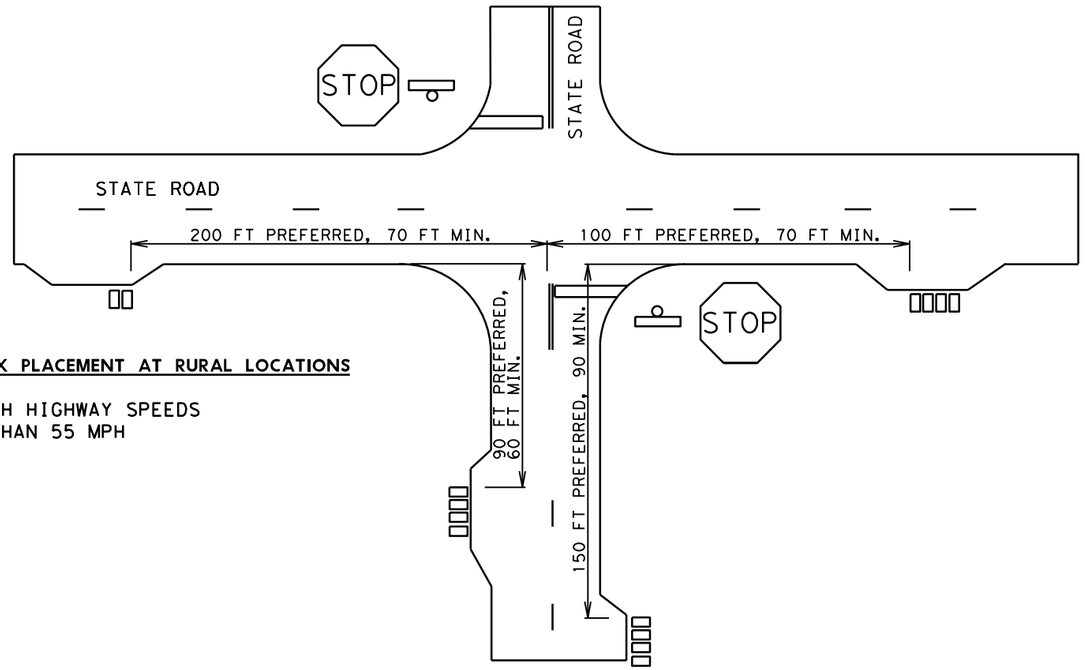
MBP(1)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 12/2012 5/2014				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		127

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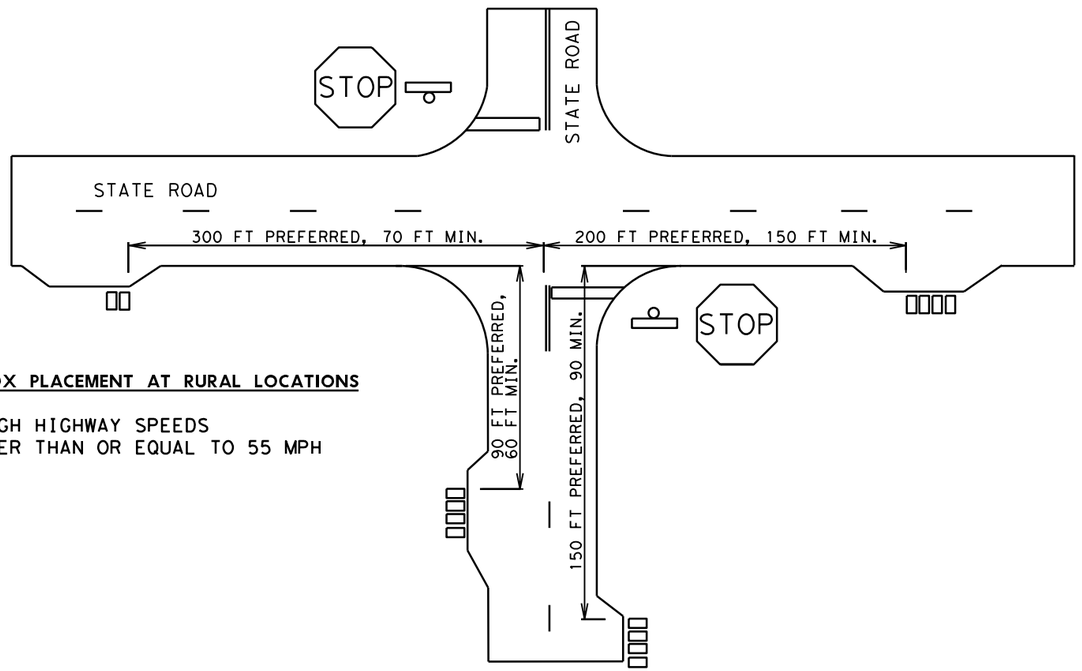
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MAILBOX PLACEMENT AT RURAL LOCATIONS

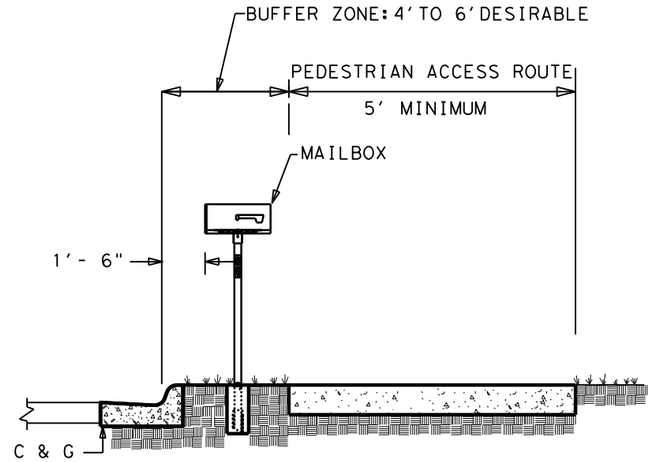
THROUGH HIGHWAY SPEEDS
LESS THAN 55 MPH



MAILBOX PLACEMENT AT RURAL LOCATIONS

THROUGH HIGHWAY SPEEDS
GREATER THAN OR EQUAL TO 55 MPH

CURB AND GUTTER MAILBOX INSTALLATION



NOTES:
1. A NON-TRAVERSABLE SURFACE MUST BE INSTALLED NEAR THE MAILBOX (NATURAL VEGETATION OR OTHER) IN THE BUFFER ZONE. ALTERNATIVELY, A BASE WITH A MINIMUM HEIGHT OF 2.5 INCHES MAY BE INSTALLED SO THAT THE EDGE OF THE MAILBOX DOES NOT EXTEND OUT MORE THAN 4 INCHES HORIZONTALLY BEYOND THE BASE.

2. THE SIDEWALK WIDTH MAY BE REDUCED TO 4 FOOT FOR SHORT DISTANCES AROUND THE MAILBOX IF NEEDED.

3. MAINTAIN A MINIMUM OF 5 FEET BETWEEN OBSTRUCTIONS IN THE PEDESTRIAN ACCESS ROUTE.

Texas Department of Transportation | Maintenance Division Standard

MAILBOX PLACEMENT CURBS & INTERSECTIONS

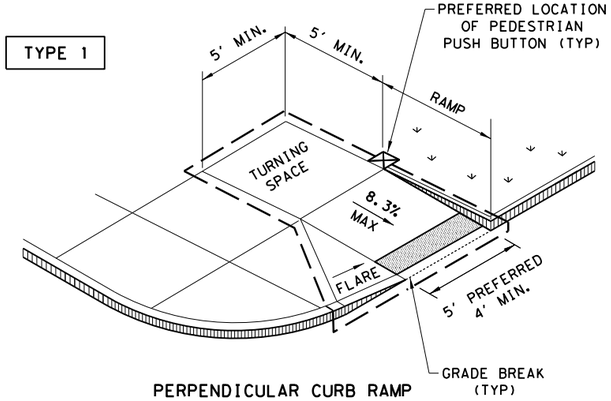
MBP(2)-22

FILE: MBP-22.DGN	DN: VS	CK:	DW: VS	CK:
© TxDOT OCTOBER 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
12/2012 5/2014	DIST	COUNTY		SHEET NO.
	AUS	HAYS		128

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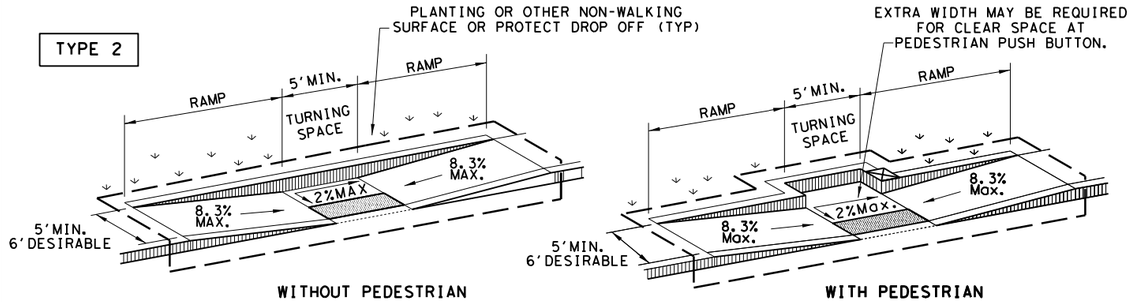
DATE: 1/27/2023
FILE: c:\pwworkdir\bgepw-projects\mhancock\dms05977\ped18.dgn

TYPE 1



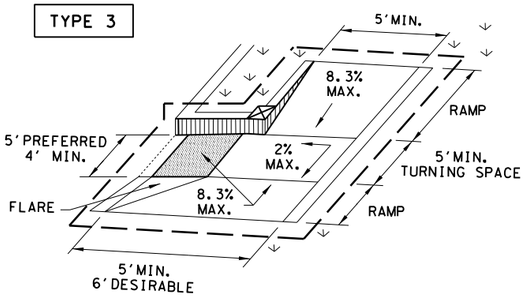
PERPENDICULAR CURB RAMP

TYPE 2

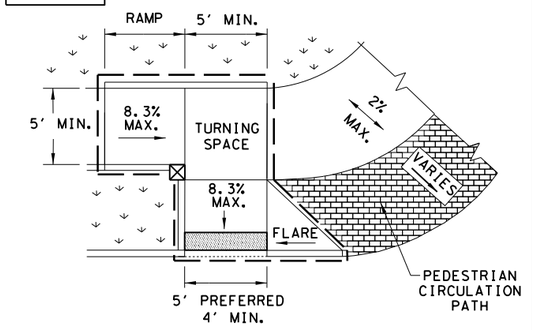


PARALLEL CURB RAMP

TYPE 3

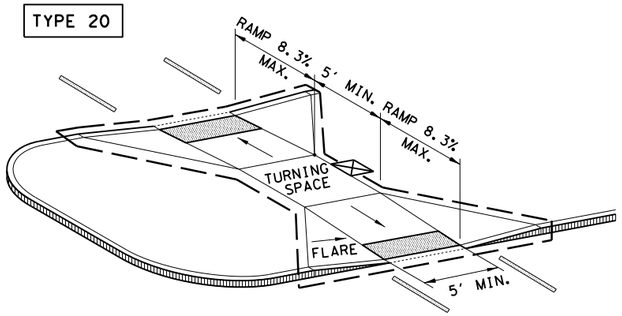


TYPE 6



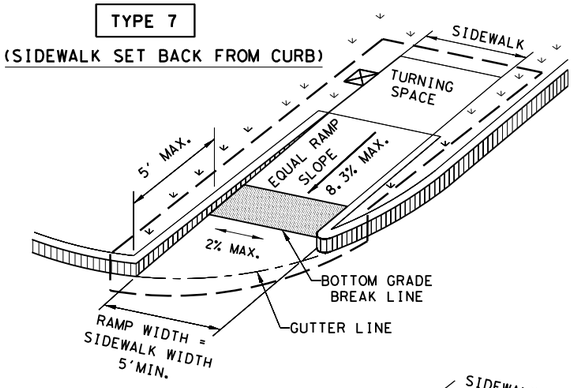
COMBINATION CURB RAMPS

TYPE 20

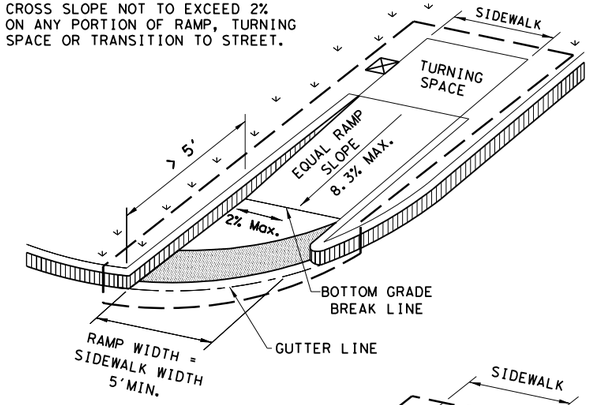


CURB RAMPS AT MEDIAN ISLANDS

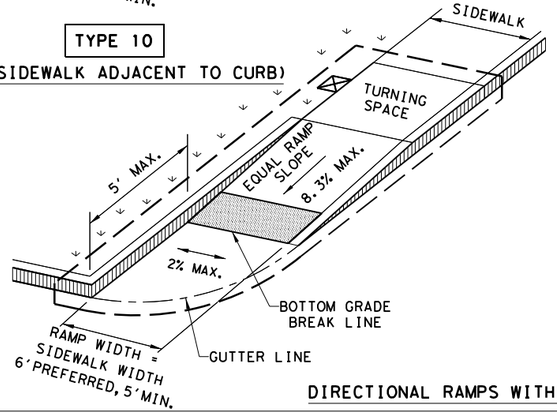
TYPE 7
(SIDEWALK SET BACK FROM CURB)



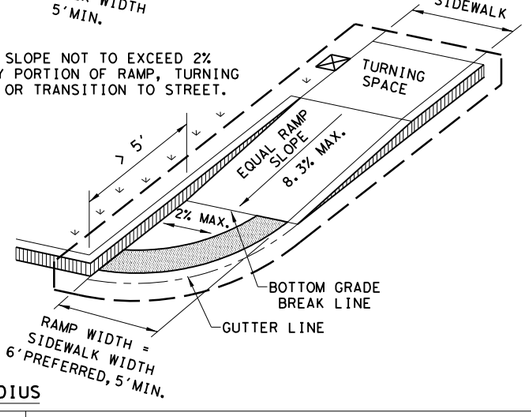
CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



TYPE 10
(SIDEWALK ADJACENT TO CURB)

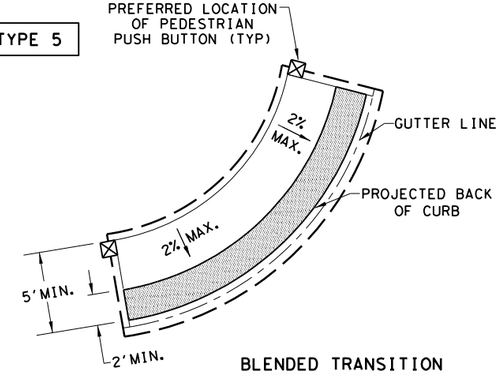


CROSS SLOPE NOT TO EXCEED 2% ON ANY PORTION OF RAMP, TURNING SPACE OR TRANSITION TO STREET.



DIRECTIONAL RAMPS WITHIN RADIUS

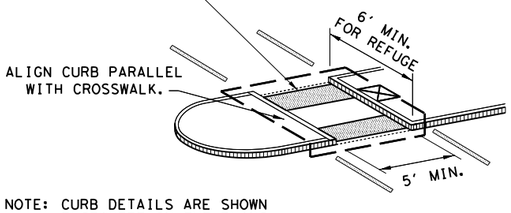
TYPE 5



BLENDED TRANSITION
(FLUSH LANDING)

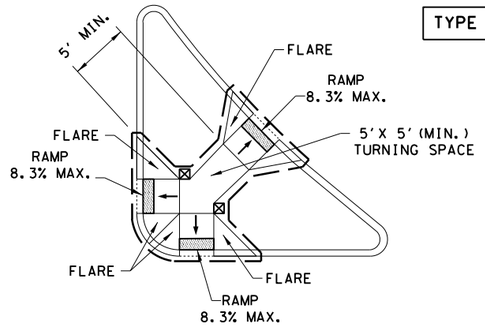
TYPE 21

INSTALL DETECTABLE WARNING SURFACE AT EACH END OF THE CUT-THROUGH RAMP WITH A MINIMUM 2' USUAL SIDEWALK SURFACE BETWEEN. IF MEDIAN IS LESS THAN 6' WIDE, ELIMINATE DETECTABLE WARNING SURFACES.



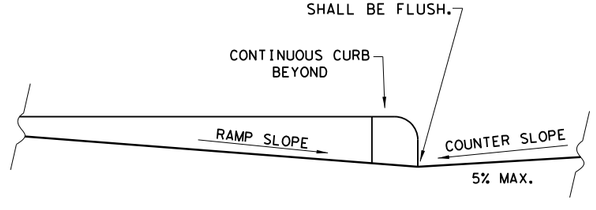
NOTE: CURB DETAILS ARE SHOWN ELSEWHERE IN THE PLANS.

TYPE 22



COMBINATION ISLAND RAMPS

BOTTOM GRADE BREAK OF CURB RAMP WILL NORMALLY BE AT GUTTER LINE. SURFACE SLOPES AT GRADE BREAKS SHALL BE FLUSH.



TYPICAL SECTION OF PERPENDICULAR CURB RAMP AT CONNECTION TO ROADWAY

NOTES / LEGEND:

SEE GENERAL NOTES ON SHEET 2 OF 4 FOR MORE INFORMATION.

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

DETECTABLE WARNING SURFACE

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON IF APPLICABLE.

GUTTER LINE

GRADE BREAK

RAMP LIMITS OF PAYMENT

Texas Department of Transportation

Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.
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GENERAL NOTES

CURB RAMPS

1. Install a curb ramp or blended transition at each pedestrian street crossing.
2. All slopes shown are maximum allowable. Cross slopes of 1.5% and lesser running should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
3. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%.
4. The minimum sidewalk width is 5'. Where the sidewalk is adjacent to the back of curb, a 6' sidewalk width is desirable. Where a 5' sidewalk cannot be provided due to site constraints, sidewalk width may be reduced to 4' for short distances. 5'x 5' passing areas at intervals not to exceed 200' are required.
5. Turning Spaces shall be 5'x 5' minimum. Cross slope shall be maximum 2%.
6. Clear space at the bottom of curb ramps shall be a minimum of 4'x 4' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
7. Provide flared sides where the pedestrian circulation path crosses the curb ramp. Flared sides shall be sloped at 10% maximum, measured parallel to the curb. Returned curbs may be used only where pedestrians would not normally walk across the ramp, either because the adjacent surface is planted, substantially obstructed, or otherwise protected.
8. Additional information on curb ramp location, design, light reflective value and texture may be found in the latest draft of the Proposed Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG) as published by the U.S. Architectural and Transportation Barriers Compliance Board (Access Board).
9. To serve as a pedestrian refuge area, the median should be a minimum of 6' wide, measured from back of curbs. Medians should be designed to provide accessible passage over or through them.
10. Small channelization islands, which do not provide a minimum 5'x 5' landing at the top of curb ramps, shall be cut through level with the surface of the street.
11. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps shall align with theoretical crosswalks unless otherwise directed.
12. Provide curb ramps to connect the pedestrian access route at each pedestrian street crossing. Handrails are not required on curb ramps.
13. Curb ramps and landings shall be constructed and paid for in accordance with Item 531 "Sidewalks".
14. Place concrete at a minimum depth of 5" for ramps, flares and landings, unless otherwise directed.
15. Furnish and install No. 3 reinforcing steel bars at 18" o.c. both ways, unless otherwise directed.
16. Provide a smooth transition where the curb ramps connect to the street.
17. Curbs shown on sheet 1 within the limits of payment are considered part of the curb ramp for payment, whether it is concrete curb, gutter, or combined curb and gutter.
18. Existing features that comply with applicalble standards may remain in place unless otherwise shown on the plans.

DETECTABLE WARNING MATERIAL

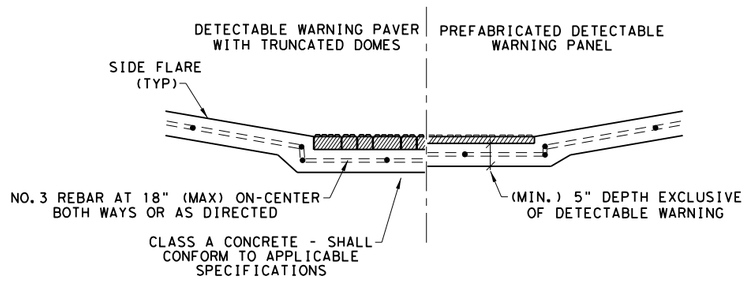
19. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with PROWAG. The surface must contrast visually with adjoining surfaces, including side flares. Furnish and install an approved cast-in-place dark brown or dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
20. Detectable Warning Materials must meet TxDOT Departmental Materials Specification DMS 4350 and be listed on the Material Producer List. Install products in accordance with manufacturer's specifications.
21. Detectable warning surfaces must be firm, stable and slip resistant.
22. Detectable warning surfaces shall be a minimum of 24 inches in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
23. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb and neither end of that edge is greater than 5 feet from the back of curb. Detectable warning surfaces may be curved along the corner radius.
24. Shaded areas on Sheet 1 of 4 indicate the approximate location for the detectable warning surface for each curb ramp type.

DETECTABLE WARNING PAVERS (IF USED)

25. Furnish detectable warning paver units meeting all requirements of ASTM C-936, C-33. Lay in a two by two unit basket weave pattern or as directed.
26. Lay full-size units first followed by closure units consisting of at least 25 percent (25%) of a full unit. Cut detectable warning paver units using a power saw.

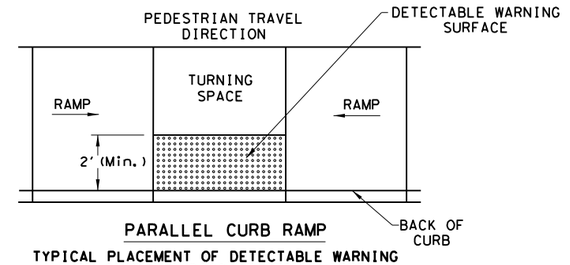
SIDEWALKS

27. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within unobstructed reach range specified in PROWAG section R406.
28. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
29. Street grades and cross slopes shall be as shown elsewhere in the plans.
30. Changes in level greater than 1/4 inch are not permitted.
31. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than five percent (5%) must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with PROWAG R409.
32. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.
33. Driveways and turnouts shall be constructed and paid for in accordance with Item "Intersections, Driveways and Turnouts". Sidewalks shall be constructed and paid for in accordance with Item, "Sidewalks".
34. Sidewalk details are shown elsewhere in the plans.



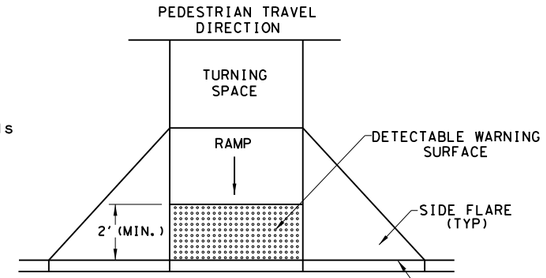
SECTION VIEW DETAIL
CURB RAMP AT DETECTIBLE WARNINGS

DETECTABLE WARNING SURFACE DETAILS



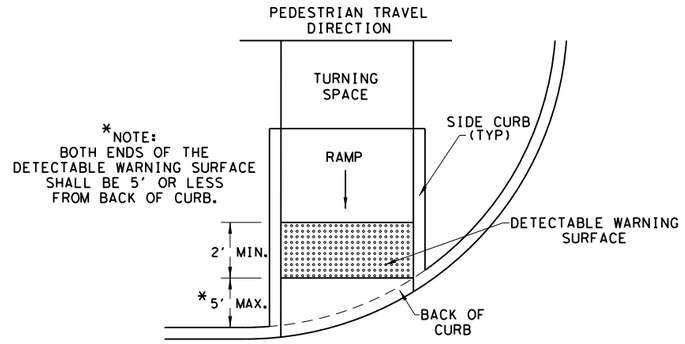
PARALLEL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON LANDING AT STREET EDGE.



PERPENDICULAR CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.



DIRECTIONAL CURB RAMP

TYPICAL PLACEMENT OF DETECTABLE WARNING SURFACE ON SLOPING RAMP RUN.

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

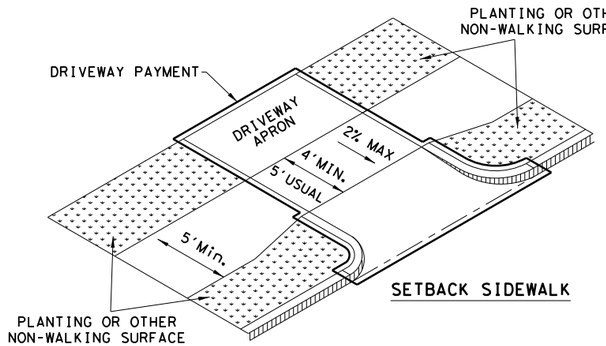
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS				HILLSIDE TER	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
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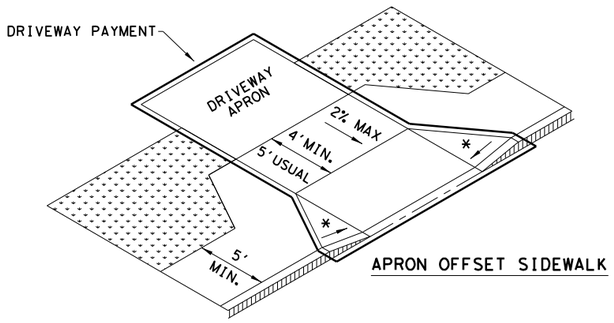
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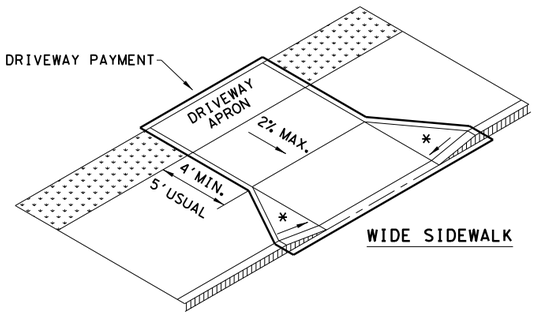
SIDEWALK TREATMENT AT DRIVEWAYS



SETBACK SIDEWALK



APRON OFFSET SIDEWALK

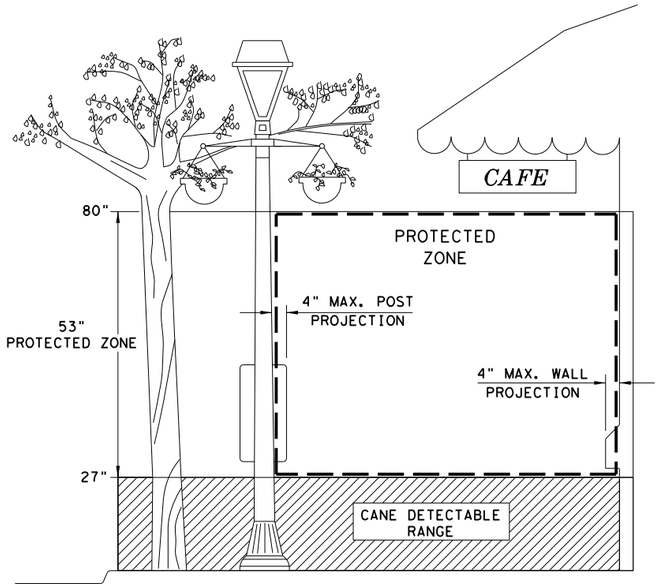


RAMP SIDEWALK

NOTES:

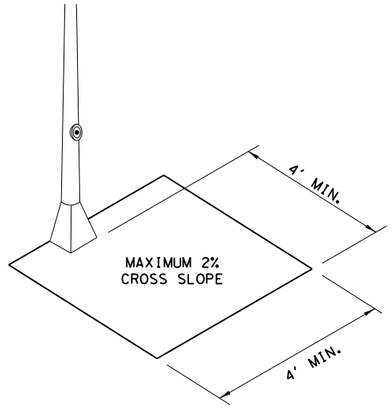
* WHERE DRIVEWAYS CROSS THE PEDESTRIAN ROUTE, SIDES SHALL BE FLARED AT 10% MAX SLOPE.

* * IF CURB HEIGHT IS GREATER THAN 6 INCHES, USE GRADE LESS THAN OR EQUAL TO 5%. HANDRAIL AND DETECTABLE WARNING ARE NOT REQUIRED.

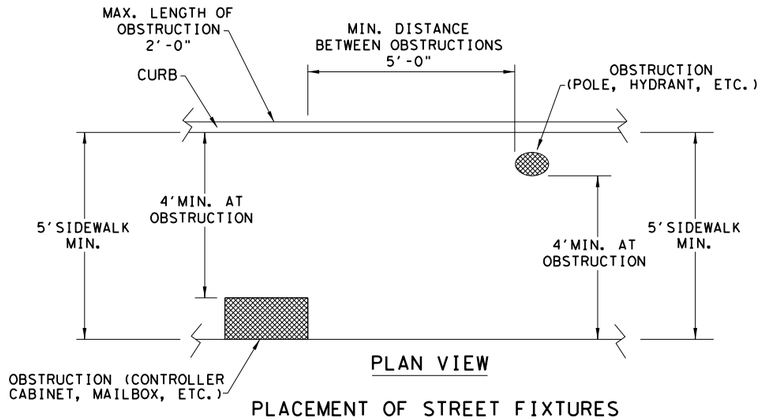


PROTECTED ZONE

NOTE: IN PEDESTRIAN CIRCULATION AREA, MAXIMUM 4" PROJECTION FOR POST OR WALL MOUNTED OBJECTS BETWEEN 27" AND 80" ABOVE THE SURFACE.



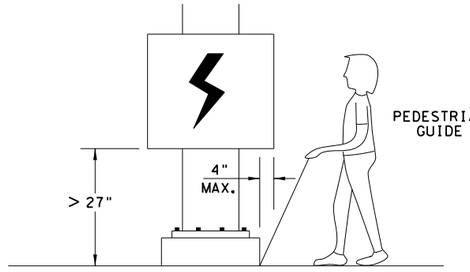
CLEAR SPACE ADJACENT TO PEDESTRIAN PUSH BUTTON



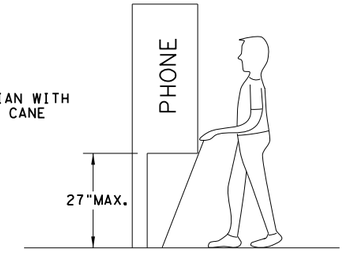
PLAN VIEW

PLACEMENT OF STREET FIXTURES

NOTE: ITEMS NOT INTENDED FOR PUBLIC USE. MINIMUM 4' X 4' CLEAR GROUND SPACE REQUIRED AT PUBLIC USE FIXTURES.



WHEN AN OBSTRUCTION OF A HEIGHT GREATER THAN 27" FROM THE SURFACE WOULD CREATE A PROTRUSION OF MORE THAN 4" INTO THE PEDESTRIAN CIRCULATION AREA, CONSTRUCT ADDITIONAL CURB OR FOUNDATION AT THE BOTTOM TO PROVIDE A MAXIMUM 4" OVERHANG.



PROTRUDING OBJECTS OF A HEIGHT ≤ 27" ARE DETECTABLE BY CANE AND DO NOT REQUIRE ADDITIONAL TREATMENT.

DETECTION BARRIER FOR VERTICAL CLEARANCE < 80"

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES CURB RAMPS

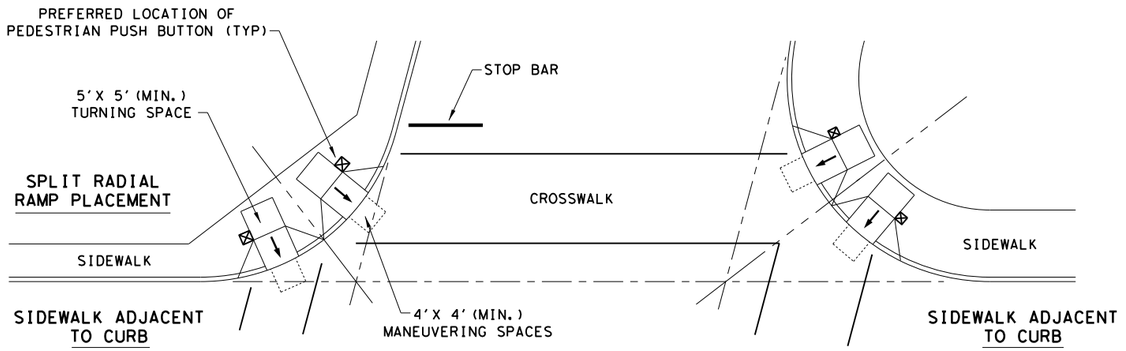
PED-18

FILE: ped18	DN: TxDOT	DW: VP	CK: KM	CK: PK & JG	
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REVISIONS				HILLSIDE TER	
REVISED 08,2005 REVISED 06,2012 REVISED 01,2018	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		131	

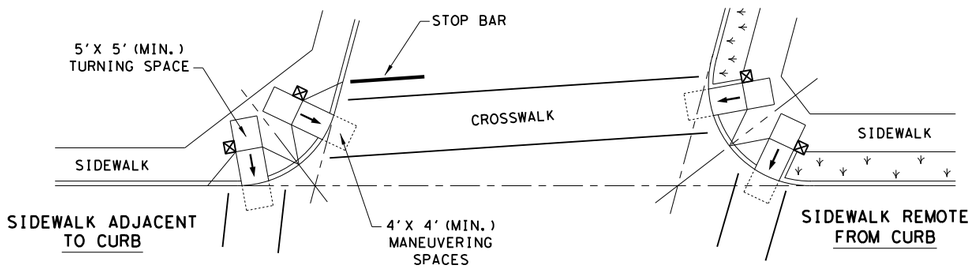
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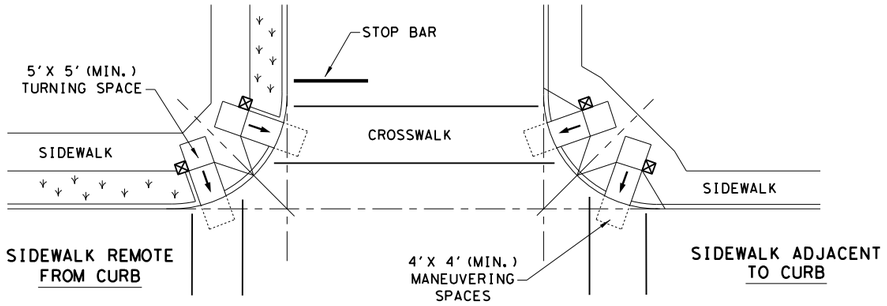
TYPICAL CROSSING LAYOUTS
SEE SHEET 1 OF 4 FOR DETAILS AND DIMENSIONS



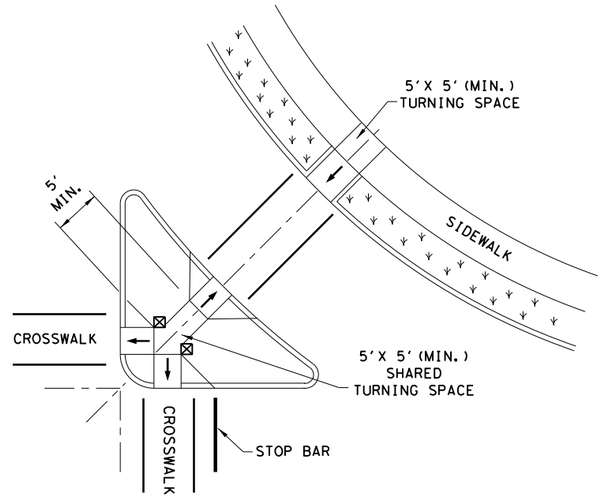
SKEWED INTERSECTION WITH "LARGE" RADIUS



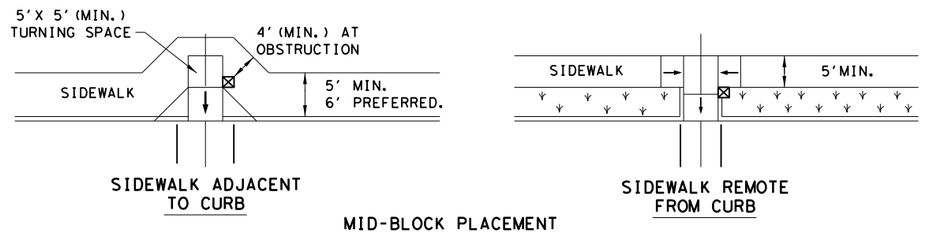
SKEWED INTERSECTION WITH "SMALL" RADIUS



NORMAL INTERSECTION WITH "SMALL" RADIUS



AT INTERSECTION
W/FREE RIGHT TURN & ISLAND



MID-BLOCK PLACEMENT
PERPENDICULAR RAMPS

LEGEND:

SHOWS DOWNWARD SLOPE. →

DENOTES PREFERRED LOCATION OF PEDESTRIAN PUSH BUTTON (IF APPLICABLE). ⊠

DENOTES PLANTING OR NON-WALKING SURFACE NOT PART OF PEDESTRIAN CIRCULATION PATH.

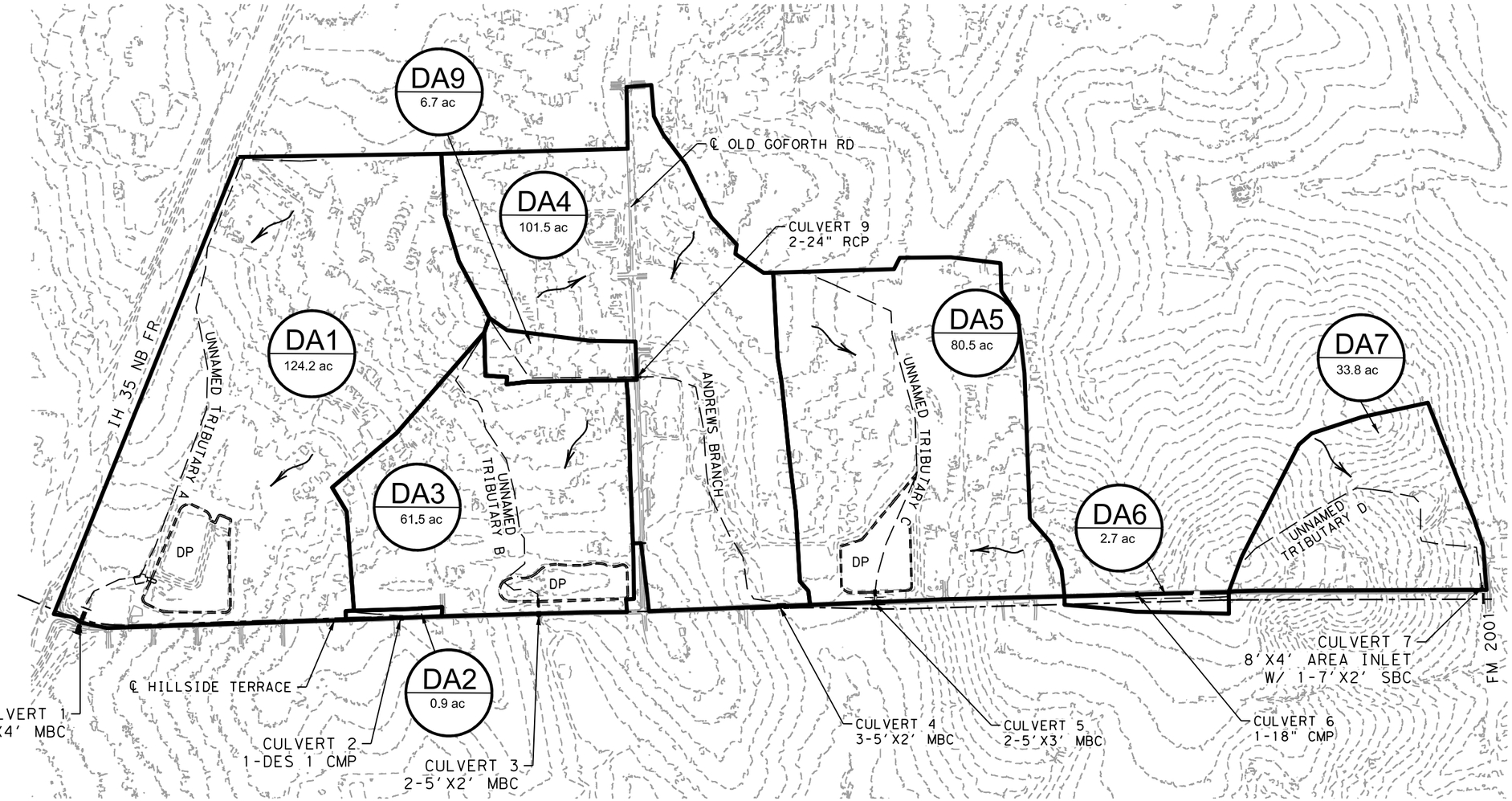
SHEET 4 OF 4

Texas Department of Transportation | Design Division Standard

PEDESTRIAN FACILITIES
CURB RAMPS

PED-18

FILE: ped18	DN: TxDOT		CK: VP	CK: KM	CK: PK & JG
© TxDOT: MARCH, 2002	CONT	SECT	JOB	HIGHWAY	
REVISIONS				HILLSIDE TER	
REVISED 08, 2005 REVISED 06, 2012 REVISED 01, 2018	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		132	



DA# / XX.X ac — CULVERT DRAINAGE AREA; DRAINAGE AREA (ACRES)

FLOW DIRECTION

CONTOUR

DRAINAGE AREA BOUNDARY

CHANNEL ℄

DP — DETENTION POND

0 400 800

SCALE: 1"=800'

EXISTING TIME OF CONCENTRATION CALCULATIONS

CULVERT	SHEET FLOW					SHALLOW CONCENTRATED FLOW					CHANNEL FLOW					TOTAL Tc (MIN)
	n	LENGTH (FT)	P2 (IN/HR)	SLOPE (FT/FT)	TIME (MIN)	PAVED/ UNPAVED	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	n	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	
1	0.15	100	4.19	0.010	11	UNPAVED	384	0.027	2.7	2	0.035	3350	0.017	5.4	10	24
2	0.15	100	4.19	0.015	10	UNPAVED	280	0.015	2.0	2	NO CHANNEL FLOW					12
3	0.15	100	4.19	0.035	7	UNPAVED	621	0.028	2.7	4	0.035	1486	0.026	5.8	4	15
4	0.15	100	4.19	0.005	15	UNPAVED	1100	0.038	3.2	6	0.035	2051	0.018	6.6	5	26
5	0.15	100	4.19	0.025	8	UNPAVED	586	0.019	2.2	4	0.035	1818	0.012	5.3	6	18
6	0.15	100	4.19	0.010	11	UNPAVED	518	0.025	2.6	3	NO CHANNEL FLOW					15
7	0.15	100	4.19	0.040	6	UNPAVED	880	0.086	4.7	3	0.04	1206	0.029	4.0	5	15
9	0.15	100	4.19	0.005	15	UNPAVED	1100	0.038	3.2	6	NO CHANNEL FLOW					21

NOTE:
1. RAINFALL DATA OBTAINED FROM NOAA ATLAS 14 RAINFALL ESTIMATES.
2. UPSTREAM DETENTION STORAGE WAS NOT INCLUDED IN HYDROLOGIC CALCULATIONS.

EXISTING RATIONAL METHOD CALCULATIONS

CULVERT	Tc (MIN)	C-VALUE	INTENSITY 25-YR	INTENSITY 100-YR	AREA (AC)	25-YR FLOW	100-YR FLOW
1	24	0.53	6.43	8.27	124.20	423.00	544.38
2	12	0.52	8.78	11.42	0.85	3.88	5.05
3	15	0.59	7.83	10.10	61.45	283.88	366.18
4	26	0.51	6.11	7.86	101.48	316.43	406.97
5	18	0.58	7.36	9.49	80.50	343.73	443.09
6	15	0.39	7.83	10.10	2.67	8.15	10.52
7	15	0.44	7.83	10.10	33.80	116.45	150.21
9	21	0.68	6.89	8.88	6.74	31.60	40.70

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

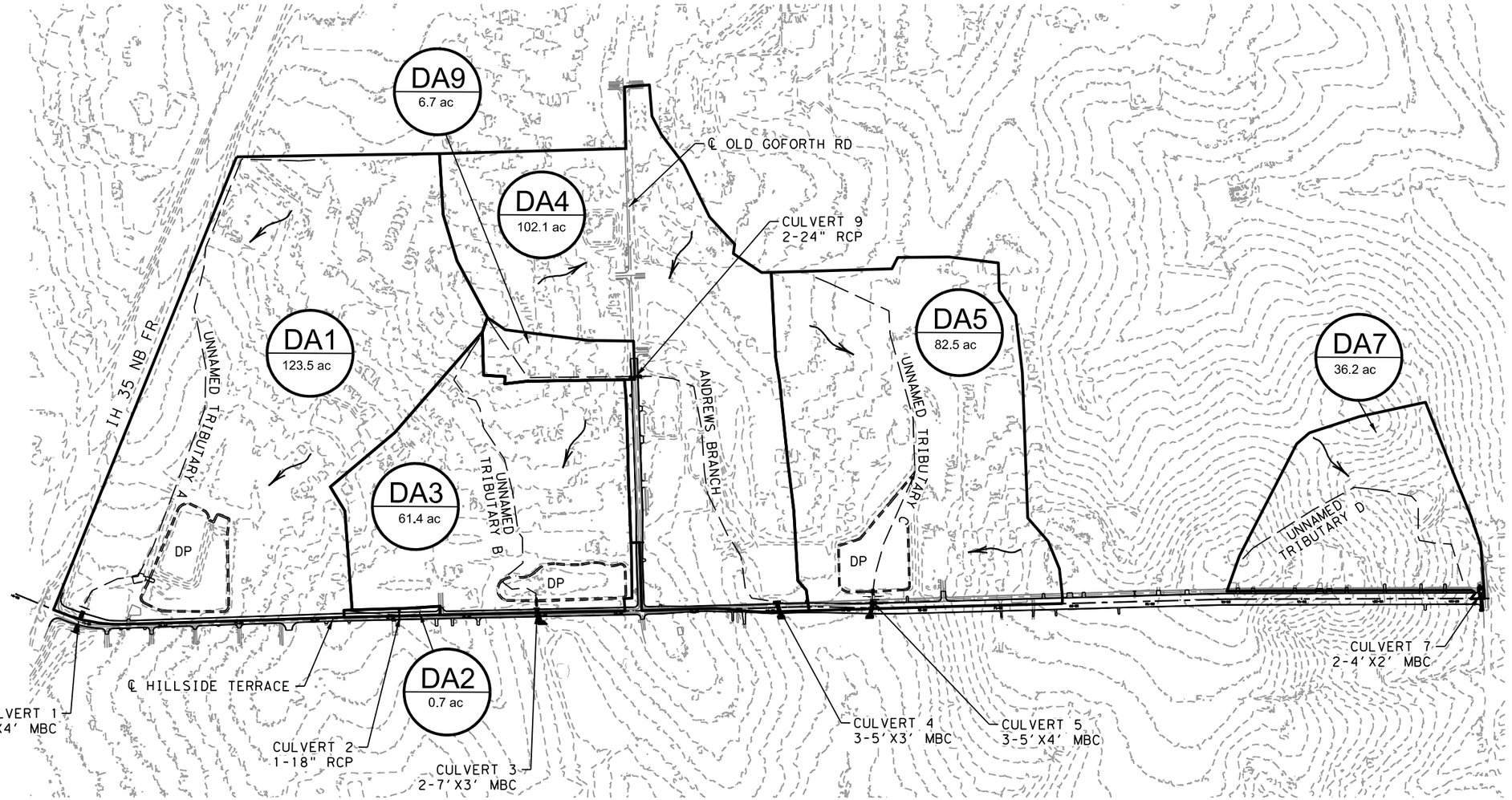
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HILLSIDE TERRACE

EXISTING DRAINAGE AREA MAP

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		133
CHECKED BY:		
APPROVED BY:		

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DA# / XX.X ac — CULVERT DRAINAGE AREA; DRAINAGE AREA (ACRES)

FLOW DIRECTION

CONTOUR

DRAINAGE AREA BOUNDARY

CHANNEL ℄

0 400 800

SCALE: 1"=800'

PROPOSED TIME OF CONCENTRATION CALCULATIONS

CULVERT	SHEET FLOW					SHALLOW CONCENTRATED FLOW					CHANNEL FLOW					TOTAL Tc (MIN)
	n	LENGTH (FT)	P2 (IN/HR)	SLOPE (FT/FT)	TIME (MIN)	PAVED/ UNPAVED	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	n	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	
1	0.15	100	4.19	0.010	11	UNPAVED	384	0.027	2.7	2	0.035	3350	0.017	5.4	10	24
2	0.15	100	4.19	0.015	10	UNPAVED	280	0.015	2.0	2	NO CHANNEL FLOW					12
3	0.15	100	4.19	0.035	7	UNPAVED	621	0.028	2.7	4	0.035	1486	0.026	5.8	4	15
4	0.15	100	4.19	0.005	15	UNPAVED	1100	0.038	3.2	6	0.035	2051	0.018	6.6	5	26
5	0.15	100	4.19	0.025	8	UNPAVED	586	0.019	2.2	4	0.035	1818	0.012	5.3	6	18
7	0.15	100	4.19	0.040	6	UNPAVED	880	0.086	4.7	3	0.04	1206	0.029	4.0	5	15
9	0.15	100	4.19	0.005	15	UNPAVED	1100	0.038	3.2	6	NO CHANNEL FLOW					21

PROPOSED RATIONAL METHOD CALCULATIONS

CULVERT	Tc (MIN)	C-VALUE	INTENSITY 25-YR (IN/HR)	INTENSITY 100-YR (IN/HR)	AREA (AC)	25-YR FLOW (CFS)	100-YR FLOW (CFS)
1	24	0.53	6.43	8.27	123.53	420.72	541.44
2	12	0.63	8.78	11.42	0.73	4.04	5.25
3	15	0.59	7.83	10.10	61.40	283.65	365.88
4	26	0.51	6.11	7.86	102.11	318.39	409.49
5	18	0.58	7.36	9.49	82.46	352.10	453.88
7	15	0.43	7.83	10.10	34.13	114.93	148.24
9	21	0.68	6.89	8.88	6.74	31.60	40.70

NOTE:
1. RAINFALL DATA OBTAINED FROM NOAA ATLAS 14 RAINFALL ESTIMATES.
2. UPSTREAM DETENTION STORAGE WAS NOT INCLUDED IN HYDROLOGIC CALCULATIONS.

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1/27/2023

NO.	DATE	REVISION	APPROVED

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HILLSIDE TERRACE

PROPOSED DRAINAGE AREA MAP

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		134
CHECKED BY:		
APPROVED BY:		

EXISTING

SITE DATA - EX CULV 14+54

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 703.39 FT
OUTLET STATION: 175.00 FT
OUTLET ELEVATION: 702.54 FT
NUMBER OF BARRELS: 3

CULVERT DATA SUMMARY - EX CULV 14+54

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 7.00 FT
BARREL RISE: 4.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 14+54

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 719.92 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 36.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 14+54

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
423.00	423.00	707.33	3.937	2.617	1-S2n	1.986	2.327	2.009	2.668	10.027	5.226
435.14	435.14	707.41	4.016	2.707	5-S2n	2.026	2.371	2.049	2.712	10.111	5.275
447.28	447.28	707.49	4.096	2.798	5-S2n	2.066	2.415	2.089	2.755	10.194	5.322
459.41	459.41	707.57	4.175	2.890	5-S2n	2.106	2.459	2.129	2.797	10.276	5.369
471.55	471.55	707.65	4.255	2.982	5-S2n	2.146	2.502	2.169	2.839	10.352	5.414
483.69	483.69	707.73	4.335	3.076	5-S2n	2.185	2.545	2.209	2.881	10.425	5.459
495.83	495.83	707.81	4.416	3.170	5-S2n	2.223	2.587	2.249	2.922	10.497	5.502
507.97	507.97	707.89	4.497	3.265	5-S2n	2.261	2.629	2.289	2.962	10.568	5.545
520.10	520.10	707.97	4.579	3.361	5-S2n	2.299	2.671	2.328	3.002	10.639	5.587
532.24	532.24	708.05	4.662	3.457	5-S2n	2.337	2.712	2.367	3.042	10.709	5.629
544.38	544.38	708.13	4.745	3.555	5-S2n	2.376	2.753	2.404	3.081	10.783	5.669

TAILWATER CHANNEL DATA - EX CULV 14+54

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 25.00 FT
SIDE SLOPE (H:V): 2.00 (_:1)
CHANNEL SLOPE: 0.0088
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 702.54 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 14+54)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
423.00	705.21	2.67	5.23	1.47	0.61
435.14	705.25	2.71	5.27	1.49	0.61
447.28	705.29	2.75	5.32	1.51	0.61
459.41	705.34	2.80	5.37	1.54	0.62
471.55	705.38	2.84	5.41	1.56	0.62
483.69	705.42	2.88	5.46	1.58	0.62
495.83	705.46	2.92	5.50	1.60	0.62
507.97	705.50	2.96	5.55	1.63	0.62
520.10	705.54	3.00	5.59	1.65	0.62
532.24	705.58	3.04	5.63	1.67	0.62
544.38	705.62	3.08	5.67	1.69	0.62

PROPOSED

SITE DATA - PROP CULV 14+54

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 703.39 FT
OUTLET STATION: 175.00 FT
OUTLET ELEVATION: 702.54 FT
NUMBER OF BARRELS: 3

CULVERT DATA SUMMARY - PROP CULV 14+54

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 7.00 FT
BARREL RISE: 4.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 14+54

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 719.39 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 84.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 14+54

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	420.72	420.72	707.31	3.922	2.600	1-S2n	1.978	2.319	2.001	2.660	10.011	5.217
	432.79	432.79	707.39	4.001	2.690	5-S2n	2.018	2.363	2.042	2.703	10.095	5.266
	444.86	444.86	707.47	4.080	2.780	5-S2n	2.058	2.407	2.081	2.746	10.178	5.313
	456.94	456.94	707.55	4.159	2.871	5-S2n	2.097	2.450	2.121	2.788	10.259	5.359
	469.01	469.01	707.63	4.238	2.963	5-S2n	2.137	2.493	2.161	2.830	10.336	5.405
	481.08	481.08	707.71	4.318	3.056	5-S2n	2.177	2.535	2.201	2.872	10.409	5.449
	493.15	493.15	707.79	4.398	3.149	5-S2n	2.215	2.578	2.241	2.913	10.481	5.493
	505.22	505.22	707.87	4.479	3.243	5-S2n	2.253	2.620	2.280	2.953	10.552	5.536
	517.30	517.30	707.95	4.560	3.338	5-S2n	2.291	2.661	2.319	2.993	10.623	5.578
	529.37	529.37	708.03	4.642	3.434	5-S2n	2.328	2.702	2.358	3.033	10.693	5.619
**	541.44	541.44	708.11	4.725	3.531	5-S2n	2.366	2.743	2.395	3.072	10.767	5.660

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 14+54

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 25.00 FT
SIDE SLOPE (H:V): 2.00 (_:1)
CHANNEL SLOPE: 0.0088
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 702.54 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 14+54)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
420.72	705.20	2.66	5.22	1.46	0.61
432.79	705.24	2.70	5.27	1.48	0.61
444.86	705.29	2.75	5.31	1.51	0.61
456.94	705.33	2.79	5.36	1.53	0.61
469.01	705.37	2.83	5.40	1.55	0.62
481.08	705.41	2.87	5.45	1.58	0.62
493.15	705.45	2.91	5.49	1.60	0.62
505.22	705.49	2.95	5.54	1.62	0.62
517.30	705.53	2.99	5.58	1.64	0.62
529.37	705.57	3.03	5.62	1.67	0.62
541.44	705.61	3.07	5.66	1.69	0.62

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

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JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

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TBPE Registration No. F-1046

HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 01
STA 14+54

DESIGNED BY:		SHEET 1 OF 7
DRAWN BY:		
CHECKED BY:		135
APPROVED BY:		

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EXISTING

SITE DATA - EX CULV 35+59

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 746.92 FT
OUTLET STATION: 28.00 FT
OUTLET ELEVATION: 746.46 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 35+59

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 1.25 FT
BARREL MATERIAL: CORRUGATED STEEL
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0240
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 35+59

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 749.91 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 25.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 35+59

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
3.88	3.88	748.21	1.213	1.292	7-M2c	0.897	0.792	0.792	0.300	4.729	1.076
4.00	4.00	748.24	1.239	1.317	7-M2c	0.919	0.804	0.804	0.304	4.789	1.084
4.11	4.11	748.26	1.266	1.341	7-M2c	0.944	0.816	0.816	0.307	4.848	1.091
4.23	4.23	748.29	1.294	1.368	7-M2c	0.969	0.827	0.827	0.310	4.908	1.099
4.35	4.35	748.31	1.321	1.394	7-M2c	0.993	0.843	0.843	0.313	4.942	1.107
4.46	4.46	748.34	1.350	1.421	7-M2c	1.018	0.854	0.854	0.317	4.999	1.114
4.58	4.58	748.37	1.378	1.449	7-M2c	1.056	0.865	0.865	0.320	5.057	1.121
4.70	4.70	748.40	1.407	1.477	7-M2c	1.098	0.876	0.876	0.323	5.114	1.128
4.82	4.82	748.43	1.436	1.507	7-M2c	1.234	0.887	0.887	0.326	5.172	1.135
4.93	4.93	748.46	1.466	1.538	7-M2c	1.250	0.898	0.898	0.329	5.230	1.142
5.05	5.05	748.49	1.496	1.571	7-M2c	1.250	0.908	0.908	0.331	5.289	1.149

TAILWATER CHANNEL DATA - EX CULV 35+59

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 40.00 (_:1)
CHANNEL SLOPE: 0.0133
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 746.46 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 35+59)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
3.88	746.76	0.30	1.08	0.25	0.49
4.00	746.76	0.30	1.08	0.25	0.49
4.11	746.77	0.31	1.09	0.25	0.49
4.23	746.77	0.31	1.10	0.26	0.49
4.35	746.77	0.31	1.11	0.26	0.49
4.46	746.78	0.32	1.11	0.26	0.49
4.58	746.78	0.32	1.12	0.27	0.49
4.70	746.78	0.32	1.13	0.27	0.50
4.82	746.79	0.33	1.14	0.27	0.50
4.93	746.79	0.33	1.14	0.27	0.50
5.05	746.79	0.33	1.15	0.28	0.50

PROPOSED

SITE DATA - PROP CULV 35+59

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 746.80 FT
OUTLET STATION: 61.00 FT
OUTLET ELEVATION: 746.05 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - PROP CULV 35+59

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 1.50 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 35+59

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 749.94 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 50.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 35+59

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	4.04	4.04	747.93	1.131	0.217	1-S2n	0.581	0.769	0.590	0.305	6.286	1.087
	4.16	4.16	747.95	1.152	0.241	1-S2n	0.590	0.781	0.599	0.308	6.309	1.095
	4.28	4.28	747.97	1.172	0.265	1-S2n	0.600	0.792	0.609	0.312	6.354	1.102
	4.40	4.40	747.99	1.193	0.289	1-S2n	0.609	0.803	0.619	0.315	6.392	1.110
	4.52	4.52	748.01	1.213	0.313	1-S2n	0.618	0.814	0.628	0.318	6.439	1.118
	4.64	4.64	748.03	1.233	0.337	1-S2n	0.627	0.825	0.637	0.321	6.493	1.125
	4.77	4.77	748.05	1.253	0.361	1-S2n	0.636	0.836	0.646	0.324	6.534	1.132
	4.89	4.89	748.07	1.273	0.386	1-S2n	0.646	0.846	0.656	0.327	6.570	1.139
	5.01	5.01	748.09	1.293	0.411	1-S2n	0.655	0.856	0.666	0.330	6.609	1.146
	5.13	5.13	748.11	1.313	0.436	1-S2n	0.664	0.866	0.675	0.333	6.649	1.153
**	5.25	5.25	748.13	1.333	0.465	1-S2n	0.673	0.880	0.684	0.336	6.689	1.160

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 35+59

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 40.00 (_:1)
CHANNEL SLOPE: 0.0133
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 746.05 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 35+59)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
4.04	746.35	0.30	1.09	0.25	0.49
4.16	746.36	0.31	1.09	0.26	0.49
4.28	746.36	0.31	1.10	0.26	0.49
4.40	746.36	0.31	1.11	0.26	0.49
4.52	746.37	0.32	1.12	0.26	0.49
4.64	746.37	0.32	1.13	0.27	0.49
4.77	746.37	0.32	1.13	0.27	0.50
4.89	746.38	0.33	1.14	0.27	0.50
5.01	746.38	0.33	1.15	0.27	0.50
5.13	746.38	0.33	1.15	0.28	0.50
5.25	746.39	0.34	1.16	0.28	0.50

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

PRELIMINARY
SUBMITTED FOR INTERIM REVIEW Under the authority of: JOHN W. TULEY, PE No 102441 DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

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HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 02
STA 35+59

DESIGNED BY:		SHEET 2 OF 7
DRAWN BY:		
CHECKED BY:		136
APPROVED BY:		

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EXISTING

SITE DATA - EX CULV 44+65

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 731.21 FT
OUTLET STATION: 28.00 FT
OUTLET ELEVATION: 730.73 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - EX CULV 44+65

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 5.00 FT
BARREL RISE: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 44+65

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 735.69 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 25.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 44+65

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
283.88	183.83	736.17	4.957	4.582	5-FFf	1.269	2.000	2.000	2.854	9.191	7.826
292.11	184.45	736.19	4.981	4.638	5-FFf	1.272	2.000	2.000	2.896	9.222	7.887
300.34	185.06	736.21	5.004	4.694	5-FFf	1.275	2.000	2.000	2.936	9.253	7.946
308.57	185.66	736.24	5.027	4.748	5-FFf	1.278	2.000	2.000	2.976	9.283	8.004
316.80	186.25	736.26	5.049	4.802	5-FFf	1.281	2.000	2.000	3.016	9.312	8.061
325.03	186.82	736.28	5.071	4.855	5-FFf	1.283	2.000	2.000	3.055	9.341	8.117
333.26	187.38	736.30	5.093	4.907	5-FFf	1.286	2.000	2.000	3.093	9.369	8.171
341.49	187.95	736.33	5.115	4.959	5-FFf	1.289	2.000	2.000	3.131	9.398	8.225
349.72	188.49	736.35	5.136	5.010	5-FFf	1.291	2.000	2.000	3.168	9.425	8.277
357.95	189.03	736.37	5.157	5.060	5-FFf	1.294	2.000	2.000	3.205	9.451	8.328
366.18	189.55	736.39	5.177	5.109	5-FFf	1.296	2.000	2.000	3.241	9.477	8.379

TAILWATER CHANNEL DATA - EX CULV 44+65

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 7.00 FT
SIDE SLOPE (H:V): 2.00 (_:1)
CHANNEL SLOPE: 0.0250
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 730.73 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 44+65)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
283.88	733.58	2.85	7.83	4.45	0.98
292.11	733.63	2.90	7.89	4.52	0.98
300.34	733.67	2.94	7.95	4.58	0.99
308.57	733.71	2.98	8.00	4.64	0.99
316.80	733.75	3.02	8.06	4.70	0.99
325.03	733.78	3.05	8.12	4.77	0.99
333.26	733.82	3.09	8.17	4.83	0.99
341.49	733.86	3.13	8.22	4.88	0.99
349.72	733.90	3.17	8.28	4.94	1.00
357.95	733.94	3.21	8.33	5.00	1.00
366.18	733.97	3.24	8.38	5.06	1.00

PROPOSED

SITE DATA - PROP CULV 44+72

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 730.42 FT
UPPER BREAK STATION: 77.10 FT
UPPER BREAK ELEVATION: 729.93 FT
LOWER BREAK STATION: 78.10 FT
LOWER BREAK ELEVATION: 725.93 FT
OUTLET STATION: 91.10 FT
OUTLET ELEVATION: 725.85 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 44+72

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 7.00 FT
BARREL RISE: 3.00 FT
UPPER & MIDDLE SECTION MATERIAL: CONCRETE
LOWER SECTION MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
UPPER & MIDDLE SECTION MANNING'S N: 0.0120
LOWER SECTION MANNING'S N: 0.0120
CULVERT TYPE: DOUBLE BROKEN-BACK
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 44+72

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 735.55 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 50.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 44+72

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	283.65	283.65	734.51	4.093	0.0*	5-S2n	0.000	0.000	3.000	3.166	6.754	6.722
	291.87	291.87	734.62	4.203	0.0*	5-S2n	0.000	0.000	3.000	3.211	6.949	6.773
	300.10	300.10	734.74	4.316	0.114	5-S2n	0.000	0.000	3.000	3.255	7.145	6.823
	308.32	308.32	734.85	4.432	0.237	5-S2n	0.000	0.000	3.000	3.299	7.341	6.872
	316.54	316.54	734.97	4.550	0.361	5-S2n	0.000	0.000	3.000	3.342	7.537	6.921
	324.76	324.76	735.09	4.671	0.488	5-S2n	0.000	0.000	3.000	3.385	7.732	6.968
	332.99	332.99	735.21	4.794	0.615	5-S2n	0.000	0.000	3.000	3.427	7.928	7.014
	341.21	341.21	735.34	4.921	0.745	5-S2n	0.000	0.000	3.000	3.468	8.124	7.060
	349.43	349.43	735.47	5.051	0.875	5-S2n	0.000	0.000	3.000	3.509	8.320	7.104
	357.66	356.03	735.58	5.157	0.989	5-S2n	0.000	0.000	3.000	3.549	8.477	7.148
**	365.88	359.20	735.63	5.209	1.065	5-S2n	0.000	0.000	3.000	3.589	8.552	7.191

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 44+72

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 7.00 FT
SIDE SLOPE (H:V): 2.00 (_:1)
CHANNEL SLOPE: 0.0165
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 725.85 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 44+72)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
283.65	729.02	3.17	6.72	3.26	0.81
291.87	729.06	3.21	6.77	3.31	0.81
300.10	729.11	3.26	6.82	3.35	0.81
308.32	729.15	3.30	6.87	3.40	0.81
316.54	729.19	3.34	6.92	3.44	0.81
324.76	729.23	3.38	6.97	3.49	0.82
332.99	729.28	3.43	7.01	3.53	0.82
341.21	729.32	3.47	7.06	3.57	0.82
349.43	729.36	3.51	7.10	3.61	0.82
357.66	729.40	3.55	7.15	3.65	0.82
365.88	729.44	3.59	7.19	3.69	0.82

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
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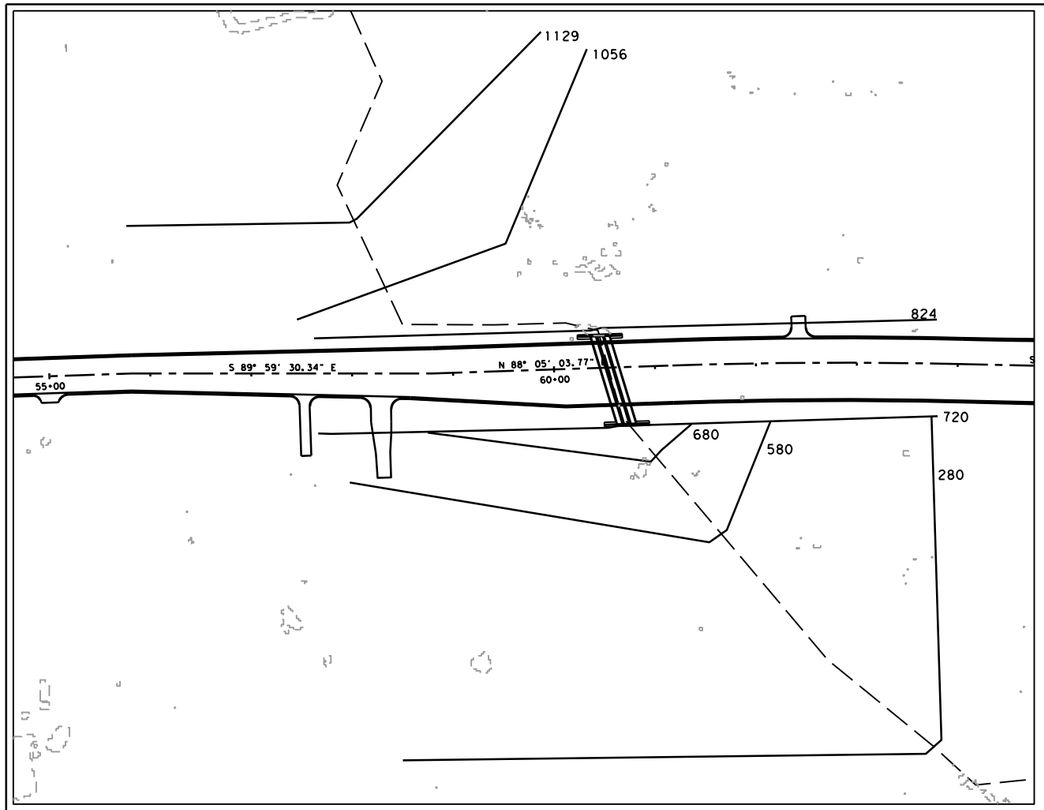
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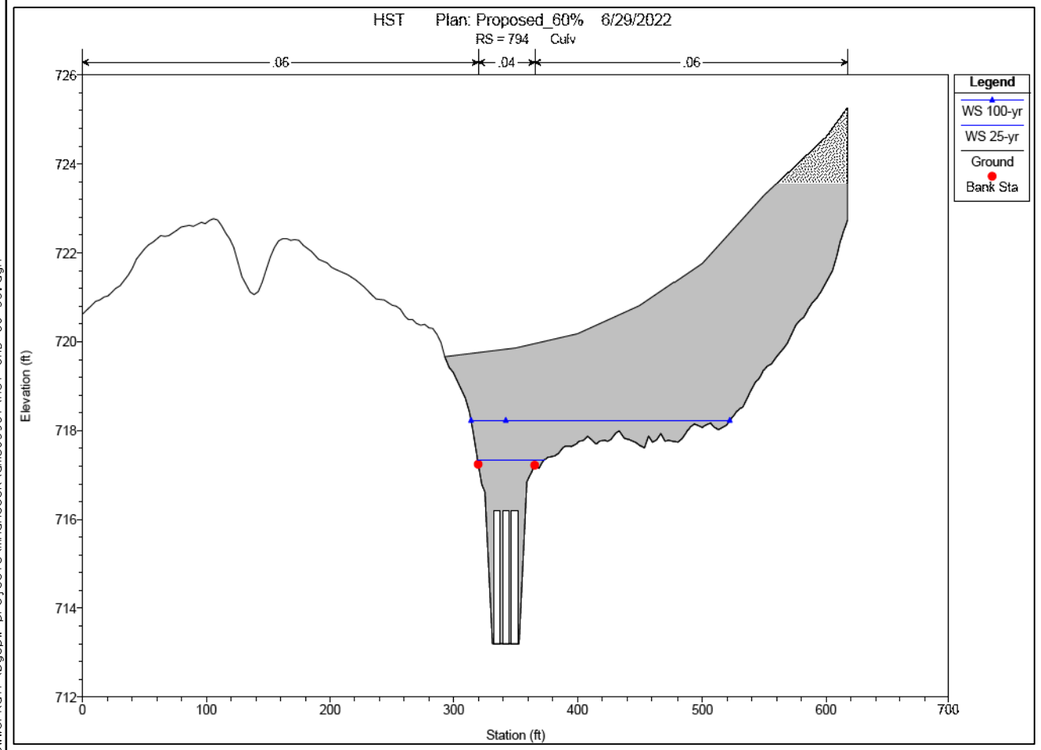
HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 03
STA 44+72

DESIGNED BY:		SHEET 3 OF 7
DRAWN BY:		
CHECKED BY:		137
APPROVED BY:		

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Plan: Prop*60% C4 C4 RS: 794 Culv Group: Culvert #1 Profile: 25-yr Profile: 25-yr			
Q Culv Group (cfs)	318.39	Culv Full Len (ft)	34.35
# Barrels	3	Culv Vel US (ft/s)	8.81
Q Barrel (cfs)	106.13	Culv Vel DS (ft/s)	7.08
E.G. US. (ft)	717.45	Culv Inv El Up (ft)	713.20
W.S. US. (ft)	717.34	Culv Inv El Dn (ft)	712.59
E.G. DS (ft)	715.89	Culv Frctn Ls (ft)	0.32
W.S. DS (ft)	715.71	Culv Exit Loss (ft)	0.60
Delta EG (ft)	1.56	Culv Entr Loss (ft)	0.63
Delta WS (ft)	1.63	Q Weir (cfs)	
E.G. IC (ft)	717.45	Weir Sta Lft (ft)	
E.G. OC (ft)	717.42	Weir Sta Rgt (ft)	
Culvert Control	Inlet	Weir Submerg	
Culv WS Inlet (ft)	715.61	Weir Max Depth (ft)	
Culv WS Outlet (ft)	715.59	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.85	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.41	Min El Weir Flow (ft)	719.67

Plan: Prop*60% C4 C4 RS: 794 Culv Group: Culvert #1 Profile: 100-yr Profile: 100-yr			
Q Culv Group (cfs)	409.49	Culv Full Len (ft)	92.1
# Barrels	3	Culv Vel US (ft/s)	9.10
Q Barrel (cfs)	136.50	Culv Vel DS (ft/s)	9.10
E.G. US. (ft)	718.30	Culv Inv El Up (ft)	713.20
W.S. US. (ft)	718.22	Culv Inv El Dn (ft)	712.59
E.G. DS (ft)	716.16	Culv Frctn Ls (ft)	0.46
W.S. DS (ft)	715.92	Culv Exit Loss (ft)	1.05
Delta EG (ft)	2.15	Culv Entr Loss (ft)	0.64
Delta WS (ft)	2.30	Q Weir (cfs)	
E.G. IC (ft)	718.68	Weir Sta Lft (ft)	
E.G. OC (ft)	718.30	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	716.20	Weir Max Depth (ft)	
Culv WS Outlet (ft)	715.59	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.23	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.85	Min El Weir Flow (ft)	719.67

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Vel Chnl (ft/s)
C4	1129	25-yr	Prop*60%	318.39	718.58	720.45	4.06
C4	1129	25-yr	Exist*60%	316.43	718.58	720.38	4.31
C4	1129	100-yr	Prop*60%	409.49	718.58	720.65	4.41
C4	1129	100-yr	Exist*60%	406.97	718.58	720.56	4.70
C4	1056	25-yr	Prop*60%	318.39	717.70	719.39	5.71
C4	1056	25-yr	Exist*60%	316.43	717.70	719.38	5.66
C4	1056	100-yr	Prop*60%	409.49	717.70	719.55	6.18
C4	1056	100-yr	Exist*60%	406.97	717.70	719.54	6.12
C4	824	25-yr	Prop*60%	318.39	713.20	717.34	2.59
C4	824	25-yr	Exist*60%	316.43	715.51	718.84	1.75
C4	824	100-yr	Prop*60%	409.49	713.20	718.22	2.34
C4	824	100-yr	Exist*60%	406.97	715.51	719.15	1.83
C4	794			Culvert			
C4	720	25-yr	Prop*60%	318.39	712.59	715.71	3.38
C4	720	25-yr	Exist*60%	316.43	714.53	716.13	5.67
C4	720	100-yr	Prop*60%	409.49	712.59	715.92	3.93
C4	720	100-yr	Exist*60%	406.97	714.53	716.35	5.92
C4	680	25-yr	Prop*60%	318.39	713.69	715.53	2.93
C4	680	25-yr	Exist*60%	316.43	713.69	715.53	2.92
C4	680	100-yr	Prop*60%	409.49	713.69	715.71	3.29
C4	680	100-yr	Exist*60%	406.97	713.69	715.70	3.28
C4	580	25-yr	Prop*60%	318.39	713.66	714.65	3.87
C4	580	25-yr	Exist*60%	316.43	713.66	714.64	3.87
C4	580	100-yr	Prop*60%	409.49	713.66	714.78	4.27
C4	580	100-yr	Exist*60%	406.97	713.66	714.78	4.25
C4	280	25-yr	Prop*60%	318.39	708.27	709.97	5.94
C4	280	25-yr	Exist*60%	316.43	708.27	709.96	5.93
C4	280	100-yr	Prop*60%	409.49	708.27	710.13	6.40
C4	280	100-yr	Exist*60%	406.97	708.27	710.13	6.40

PRELIMINARY

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Under the authority of:

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Tel: 512-879-0400 ● www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 04
STA 60+55

DESIGNED BY:		SHEET 4 OF 7
DRAWN BY:		
CHECKED BY:		138
APPROVED BY:		

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EXISTING

SITE DATA - EX CULV 66+70

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 712.90 FT
OUTLET STATION: 28.00 FT
OUTLET ELEVATION: 712.51 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - EX CULV 66+70

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 5.00 FT
BARREL RISE: 3.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 66+70

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 719.04 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 25.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 66+70

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
343.73	302.20	719.31	6.408	5.174	5-S2n	1.944	3.000	2.475	2.915	12.210	6.292
353.67	303.46	719.34	6.443	5.196	5-S2n	1.949	3.000	2.482	2.956	12.225	6.341
363.60	304.69	719.38	6.476	5.217	5-S2n	1.955	3.000	2.489	2.997	12.241	6.388
373.54	305.87	719.41	6.509	5.274	5-S2n	1.961	3.000	2.495	3.037	12.257	6.435
383.47	306.99	719.44	6.540	5.333	5-S2n	1.966	3.000	2.502	3.077	12.272	6.481
393.41	308.07	719.47	6.570	5.391	5-S2n	1.971	3.000	2.508	3.116	12.283	6.526
403.35	309.11	719.50	6.599	5.447	5-S2n	1.976	3.000	2.514	3.154	12.294	6.570
413.28	310.13	719.53	6.628	5.503	4-FFf	1.980	3.000	3.192	3.192	10.338	6.613
423.22	311.12	719.56	6.656	5.558	4-FFf	1.985	3.000	3.000	3.230	10.371	6.655
433.15	312.05	719.58	6.682	5.611	4-FFf	1.989	3.000	3.000	3.267	10.402	6.697
443.09	312.98	719.61	6.708	5.664	4-FFf	1.993	3.000	3.000	3.303	10.433	6.737

TAILWATER CHANNEL DATA - EX CULV 66+70

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 10.00 FT
SIDE SLOPE (H:V): 3.00 (_:1)
CHANNEL SLOPE: 0.0152
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 712.51 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 66+70)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
343.73	715.42	2.91	6.29	2.76	0.79
353.67	715.47	2.96	6.34	2.80	0.79
363.60	715.51	3.00	6.39	2.84	0.79
373.54	715.55	3.04	6.44	2.88	0.79
383.47	715.59	3.08	6.48	2.92	0.79
393.41	715.63	3.12	6.53	2.96	0.79
403.35	715.66	3.15	6.57	2.99	0.79
413.28	715.70	3.19	6.61	3.03	0.80
423.22	715.74	3.23	6.66	3.06	0.80
433.15	715.78	3.27	6.70	3.10	0.80
443.09	715.81	3.30	6.74	3.13	0.80

PROPOSED

SITE DATA - PROP CULV 66+70

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 712.28 FT
OUTLET STATION: 93.30 FT
OUTLET ELEVATION: 712.05 FT
NUMBER OF BARRELS: 3

CULVERT DATA SUMMARY - PROP CULV 66+70

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 5.00 FT
BARREL RISE: 4.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 66+70

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 718.23 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 71.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 66+70

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	352.10	352.10	716.71	4.402	4.428	3-M2†	3.074	2.577	2.950	2.950	7.958	6.333
	362.28	362.28	716.79	4.497	4.512	3-M2†	3.143	2.626	2.992	2.992	8.073	6.382
	372.46	372.46	716.88	4.593	4.596	3-M2†	3.211	2.675	3.033	3.033	8.187	6.430
	382.63	382.63	716.97	4.690	4.679	3-M2†	3.279	2.724	3.074	3.074	8.300	6.477
	392.81	392.81	717.07	4.788	4.762	3-M2†	3.347	2.772	3.114	3.114	8.411	6.523
	402.99	402.99	717.17	4.887	4.844	3-M2†	3.414	2.820	3.153	3.153	8.521	6.568
	413.17	413.17	717.27	4.988	4.925	3-M2†	3.481	2.867	3.192	3.192	8.630	6.612
	423.35	423.35	717.37	5.089	5.005	3-M2†	3.548	2.914	3.230	3.230	8.737	6.656
	433.52	433.52	717.47	5.193	5.085	3-M2†	3.615	2.960	3.268	3.268	8.844	6.698
	443.70	443.70	717.58	5.297	5.164	3-M2†	4.000	3.006	3.305	3.305	8.949	6.740
**	453.88	453.88	717.68	5.403	5.243	3-M2†	4.000	3.052	3.342	3.342	9.054	6.781

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 66+70

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 10.00 FT
SIDE SLOPE (H:V): 3.00 (_:1)
CHANNEL SLOPE: 0.0152
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 712.05 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 66+70)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
352.10	715.00	2.95	6.33	2.80	0.79
362.28	715.04	2.99	6.38	2.84	0.79
372.46	715.08	3.03	6.43	2.88	0.79
382.63	715.12	3.07	6.48	2.92	0.79
392.81	715.16	3.11	6.52	2.95	0.79
402.99	715.20	3.15	6.57	2.99	0.79
413.17	715.24	3.19	6.61	3.03	0.80
423.35	715.28	3.23	6.66	3.06	0.80
433.52	715.32	3.27	6.70	3.10	0.80
443.70	715.36	3.31	6.74	3.14	0.80
453.88	715.39	3.34	6.78	3.17	0.80

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

1/27/2023

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 05
STA 66+70

DESIGNED BY:		SHEET 5 OF 7
DRAWN BY:		
CHECKED BY:		139
APPROVED BY:		

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EXISTING

SITE DATA - EX CULV 106+78

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 687.37 FT
OUTLET STATION: 105.48 FT
OUTLET ELEVATION: 686.26 FT
NUMBER OF BARRELS: 1

CULVERT DATA SUMMARY - EX CULV 106+78

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 7.00 FT
BARREL RISE: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 106+78

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 691.74 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 40.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 106+78

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
116.45	116.45	691.71	4.338	4.102	4-Fff	1.335	2.000	2.000	2.939	8.318	4.495
119.83	117.79	691.77	4.403	4.186	4-Fff	1.346	2.000	2.000	2.970	8.413	4.527
123.20	118.39	691.80	4.433	4.241	4-Fff	1.350	2.000	2.000	3.001	8.456	4.559
126.58	118.87	691.83	4.457	4.291	4-Fff	1.354	2.000	2.000	3.032	8.491	4.590
129.95	119.31	691.85	4.478	4.338	4-Fff	1.357	2.000	2.000	3.062	8.522	4.620
133.33	119.70	691.87	4.498	4.383	4-Fff	1.360	2.000	2.000	3.092	8.550	4.650
136.71	120.06	691.89	4.516	4.427	5-Fff	1.363	2.000	2.000	3.121	8.576	4.679
140.08	120.41	691.90	4.533	4.470	5-Fff	1.366	2.000	2.000	3.149	8.601	4.708
143.46	120.74	691.92	4.550	4.511	5-Fff	1.368	2.000	2.000	3.178	8.624	4.736
146.83	121.05	691.94	4.565	4.552	5-Fff	1.371	2.000	2.000	3.206	8.646	4.763
150.21	121.15	691.95	4.570	4.583	4-Fff	1.371	2.000	2.000	3.233	8.653	4.790

TAILWATER CHANNEL DATA - EX CULV 106+78

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 3.00 (_:1)
CHANNEL SLOPE: 0.0119
CHANNEL MANNING'S N: 0.0450
CHANNEL INVERT ELEVATION: 686.26 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 106+78)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
116.45	689.20	2.94	4.50	2.18	0.65
119.83	689.23	2.97	4.53	2.21	0.65
123.20	689.26	3.00	4.56	2.23	0.66
126.58	689.29	3.03	4.59	2.25	0.66
129.95	689.32	3.06	4.62	2.27	0.66
133.33	689.35	3.09	4.65	2.30	0.66
136.71	689.38	3.12	4.68	2.32	0.66
140.08	689.41	3.15	4.71	2.34	0.66
143.46	689.44	3.18	4.74	2.36	0.66
146.83	689.47	3.21	4.76	2.38	0.66
150.21	689.49	3.23	4.79	2.40	0.66

PROPOSED

SITE DATA - PROP CULV 106+78

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 686.59 FT
OUTLET STATION: 126.50 FT
OUTLET ELEVATION: 686.17 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 106+78

BARREL SHAPE: CONCRETE BOX
BARREL SPAN: 4.00 FT
BARREL RISE: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE (90°) HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 106+78

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 691.10 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 104.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 106+78

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	114.93	114.93	690.76	3.633	4.170	4-Fff	2.000	1.858	2.000	2.661	7.183	5.410
	118.26	118.26	690.90	3.756	4.312	4-Fff	2.000	1.893	2.000	2.690	7.391	5.448
	121.59	121.59	691.05	3.882	4.457	4-Fff	2.000	1.929	2.000	2.718	7.600	5.486
	124.92	123.16	691.13	3.942	4.540	4-Fff	2.000	1.945	2.000	2.746	7.697	5.524
	128.25	123.34	691.16	3.949	4.574	4-Fff	2.000	1.947	2.000	2.773	7.709	5.560
	131.59	123.36	691.19	3.950	4.602	4-Fff	2.000	1.947	2.000	2.800	7.710	5.596
	134.92	123.51	691.21	3.956	4.633	4-Fff	2.000	1.949	2.000	2.826	7.719	5.631
	138.25	123.43	691.24	3.953	4.657	4-Fff	2.000	1.948	2.000	2.852	7.715	5.665
	141.58	123.32	691.26	3.948	4.678	4-Fff	2.000	1.947	2.000	2.878	7.707	5.699
	144.91	123.21	691.27	3.944	4.699	4-Fff	2.000	1.946	2.000	2.903	7.700	5.732
**	148.24	123.09	691.29	3.940	4.720	4-Fff	2.000	1.945	2.000	2.928	7.693	5.765

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 106+78

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 3.00 (_:1)
CHANNEL SLOPE: 0.0119
CHANNEL MANNING'S N: 0.0350
CHANNEL INVERT ELEVATION: 686.17 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 106+78)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
114.93	688.83	2.66	5.41	1.98	0.83
118.26	688.86	2.69	5.45	2.00	0.83
121.59	688.89	2.72	5.49	2.02	0.83
124.92	688.92	2.75	5.52	2.04	0.83
128.25	688.94	2.77	5.56	2.06	0.83
131.59	688.97	2.80	5.60	2.08	0.83
134.92	689.00	2.83	5.63	2.10	0.83
138.25	689.02	2.85	5.67	2.12	0.84
141.58	689.05	2.88	5.70	2.14	0.84
144.91	689.07	2.90	5.73	2.16	0.84
148.24	689.10	2.93	5.77	2.17	0.84

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

EXISTING INLET

INLET INPUT

INLET IN SAG
GRATE TYPE: P - 1-7/8
GRATE WIDTH: 8 FT
GRATE LENGTH: 4 FT
PERCENT CLOGGING: 50%

OUTPUT 25-YR (116.45 CFS)

PERIMETER: 24.0 FT
EFF PERIMETER: 12.0 FT
AREA: 28.8 FT2
EFF AREA: 14.4 FT2
DEPTH AT CENTER OF GRATE: 2.27 FT
COMPUTER TOP WIDTH AT SAG: 22.6 FT

OUTPUT 100-YR (150.21 CFS)

PERIMETER: 24.0 FT
EFF PERIMETER: 12.0 FT
AREA: 28.8 FT2
EFF AREA: 14.4 FT2
DEPTH AT CENTER OF GRATE: 3.77 FT
COMPUTER TOP WIDTH AT SAG: 75.4 FT

NOTE: FHWA HYDRAULIC TOOLBOX 4.4 WAS USED TO EVALUATE INLETS

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY, STATE OF TEXAS

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

HYDRAULIC DATA
CULVERT 07
STA 106+78

DESIGNED BY:		SHEET 6 OF 7
DRAWN BY:		
CHECKED BY:		140
APPROVED BY:		

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EXISTING

SITE DATA - EX CULV 15+42

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 748.98 FT
OUTLET STATION: 50.00 FT
OUTLET ELEVATION: 748.03 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - EX CULV 15+42

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: EX CULV 15+42

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 753.89 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 32.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: EX CULV 15+42

TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
31.60	31.60	751.32	2.338	1.274	5-S2n	0.960	1.428	1.037	0.823	9.601	3.112
32.51	32.51	751.37	2.395	1.341	5-S2n	0.976	1.449	1.056	0.832	9.664	3.134
33.42	33.42	751.43	2.454	1.412	5-S2n	0.991	1.472	1.074	0.840	9.726	3.156
34.33	34.33	751.49	2.514	1.481	5-S2n	1.007	1.491	1.091	0.849	9.797	3.177
35.24	35.24	751.56	2.575	1.795	5-S2n	1.023	1.511	1.109	0.857	9.851	3.198
36.15	36.15	751.62	2.639	1.856	5-S2n	1.039	1.529	1.127	0.865	9.906	3.218
37.06	37.06	751.68	2.704	1.919	5-S2n	1.055	1.548	1.145	0.873	9.971	3.238
37.97	37.97	751.75	2.770	1.982	5-S2n	1.071	1.566	1.162	0.881	10.029	3.258
38.88	38.88	751.82	2.838	2.046	5-S2n	1.087	1.583	1.180	0.889	10.088	3.277
39.79	39.79	751.89	2.908	2.112	5-S2n	1.102	1.600	1.197	0.897	10.146	3.296
40.70	40.70	751.96	2.980	2.179	5-S2n	1.118	1.617	1.214	0.905	10.203	3.315

TAILWATER CHANNEL DATA - EX CULV 15+42

TAILWATER CHANNEL OPTION: TRIANGULAR CHANNEL
SIDE SLOPE (H:V): 15.00 (*:1)
CHANNEL SLOPE: 0.0230
CHANNEL MANNING'S N: 0.0400
CHANNEL INVERT ELEVATION: 748.03 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: EX CULV 15+42)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
31.60	748.85	0.82	3.11	1.18	0.85
32.51	748.86	0.83	3.13	1.19	0.86
33.42	748.87	0.84	3.16	1.21	0.86
34.33	748.88	0.85	3.18	1.22	0.86
35.24	748.89	0.86	3.20	1.23	0.86
36.15	748.90	0.87	3.22	1.24	0.86
37.06	748.90	0.87	3.24	1.25	0.86
37.97	748.91	0.88	3.26	1.27	0.86
38.88	748.92	0.89	3.28	1.28	0.87
39.79	748.93	0.90	3.30	1.29	0.87
40.70	748.93	0.90	3.32	1.30	0.87

PROPOSED

SITE DATA - PROP CULV 15+42

SITE DATA OPTION: CULVERT INVERT DATA
INLET STATION: 0.00 FT
INLET ELEVATION: 749.02 FT
OUTLET STATION: 59.00 FT
OUTLET ELEVATION: 747.23 FT
NUMBER OF BARRELS: 2

CULVERT DATA SUMMARY - PROP CULV 15+42

BARREL SHAPE: CIRCULAR
BARREL DIAMETER: 2.00 FT
BARREL MATERIAL: CONCRETE
EMBEDMENT: 0.00 IN
BARREL MANNING'S N: 0.0120
CULVERT TYPE: STRAIGHT
INLET CONFIGURATION: SQUARE EDGE WITH HEADWALL
INLET DEPRESSION: NONE

ROADWAY DATA FOR CROSSING: PROP CULV 15+42

ROADWAY PROFILE SHAPE: CONSTANT ROADWAY ELEVATION
CREST LENGTH: 100.00 FT
CREST ELEVATION: 753.66 FT
ROADWAY SURFACE: PAVED
ROADWAY TOP WIDTH: 45.00 FT

TABLE 1 - CULVERT SUMMARY TABLE: PROP CULV 15+42

	TOTAL DISCHARGE (CFS)	CULVERT DISCHARGE (CFS)	HEADWATER ELEVATION (FT)	INLET CONTROL DEPTH (FT)	OUTLET CONTROL DEPTH (FT)	FLOW TYPE	NORMAL DEPTH (FT)	CRITICAL DEPTH (FT)	OUTLET DEPTH (FT)	TAILWATER DEPTH (FT)	OUTLET VELOCITY (FT/S)	TAILWATER VELOCITY (FT/S)
*	31.60	31.60	751.35	2.326	0.471	5-S2n	0.839	1.428	0.915	0.652	11.271	3.069
	32.51	32.51	751.40	2.384	0.540	5-S2n	0.853	1.449	0.932	0.661	11.341	3.091
	33.42	33.42	751.46	2.442	0.614	5-S2n	0.866	1.472	0.947	0.669	11.416	3.114
	34.33	34.33	751.52	2.502	0.685	5-S2n	0.880	1.491	0.962	0.677	11.481	3.135
	35.24	35.24	751.58	2.564	1.001	5-S2n	0.894	1.511	0.977	0.686	11.556	3.157
	36.15	36.15	751.65	2.627	1.065	5-S2n	0.907	1.529	0.992	0.694	11.631	3.178
	37.06	37.06	751.71	2.692	1.130	5-S2n	0.920	1.548	1.006	0.701	11.705	3.198
	37.97	37.97	751.78	2.759	1.196	5-S2n	0.933	1.566	1.021	0.709	11.778	3.219
	38.88	38.88	751.85	2.827	1.263	5-S2n	0.945	1.583	1.035	0.717	11.849	3.238
	39.79	39.79	751.92	2.897	1.331	5-S2n	0.958	1.600	1.050	0.724	11.910	3.258
**	40.70	40.70	751.99	2.969	1.401	5-S2n	0.970	1.617	1.065	0.732	11.962	3.277

* DESIGN FLOW IS 25-YEAR EVENT.
** CHECK FLOW IS 100-YEAR EVENT.

TAILWATER CHANNEL DATA - PROP CULV 15+42

TAILWATER CHANNEL OPTION: TRAPEZOIDAL CHANNEL
BOTTOM WIDTH: 6.00 FT
SIDE SLOPE (H:V): 15.00 (*:1)
CHANNEL SLOPE: 0.0230
CHANNEL MANNING'S N: 0.0400

CHANNEL INVERT ELEVATION: 747.23 FT

TABLE 2 - DOWNSTREAM CHANNEL RATING CURVE (CROSSING: PROP CULV 15+42)

FLOW (CFS)	WATER SURFACE ELEV (FT)	DEPTH (FT)	VELOCITY (FT/S)	SHEAR (PSF)	FROUDE NUMBER
31.60	747.88	0.65	3.07	0.94	0.85
32.51	747.89	0.66	3.09	0.95	0.85
33.42	747.90	0.67	3.11	0.96	0.86
34.33	747.91	0.68	3.14	0.97	0.86
35.24	747.92	0.69	3.16	0.98	0.86
36.15	747.92	0.69	3.18	1.00	0.86
37.06	747.93	0.70	3.20	1.01	0.86
37.97	747.94	0.71	3.22	1.02	0.86
38.88	747.95	0.72	3.24	1.03	0.86
39.79	747.95	0.72	3.26	1.04	0.87
40.70	747.96	0.73	3.28	1.05	0.87

NOTE: PROGRAM USED TO EVALUATE STRUCTURES WAS HY-8 VERSION 7.30

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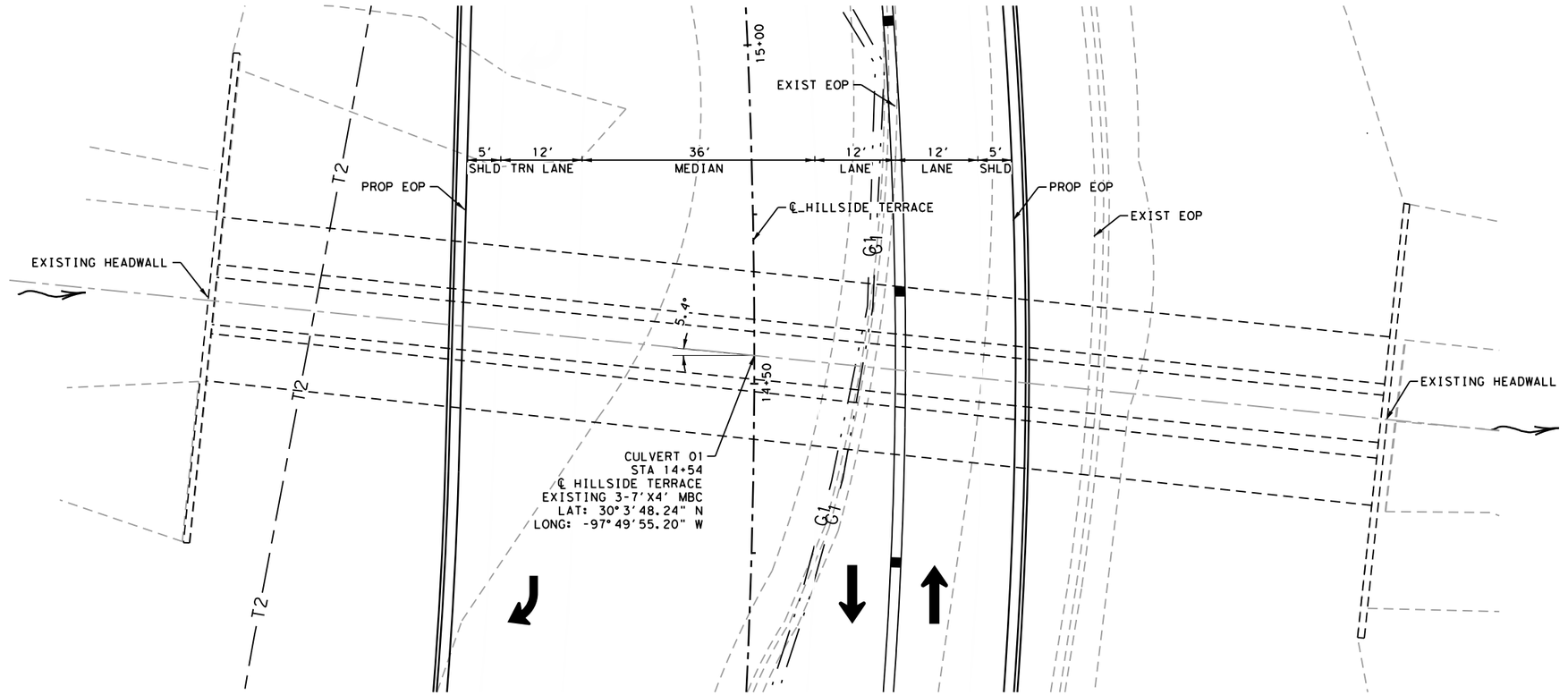
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OLD GOFORTH RD

HYDRAULIC DATA
CULVERT 09
STA 15+42

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CHECKED BY:		141
APPROVED BY:		

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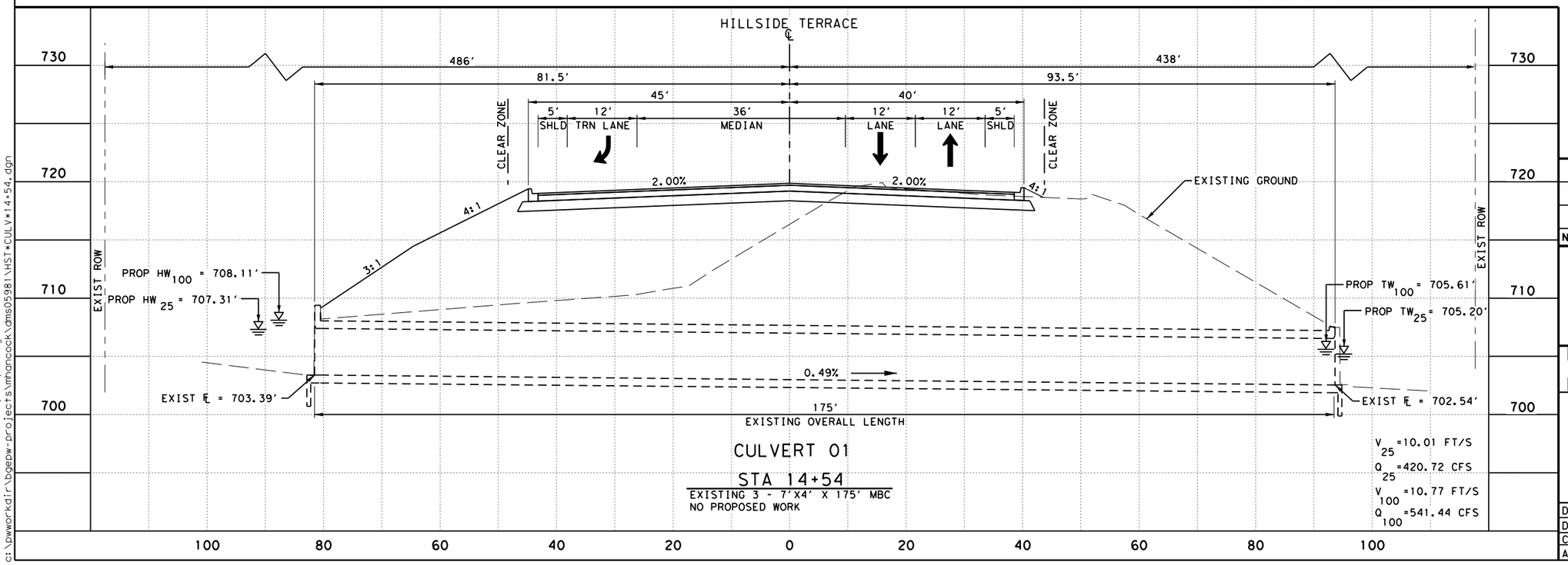
EXIST NBI NO - 141060AA0133001
PROP NBI NO - XXXXXXXXXXXXXX

LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

HORZ 0' 10' 20'
VERT 0' 5' 10'

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.



CULVERT 01

STA 14+54

EXISTING 3 - 7'X4' X 175' MBC
NO PROPOSED WORK

V_{25} =10.01 FT/S
Q_{25} =420.72 CFS
V_{100} =10.77 FT/S
Q_{100} =541.44 CFS

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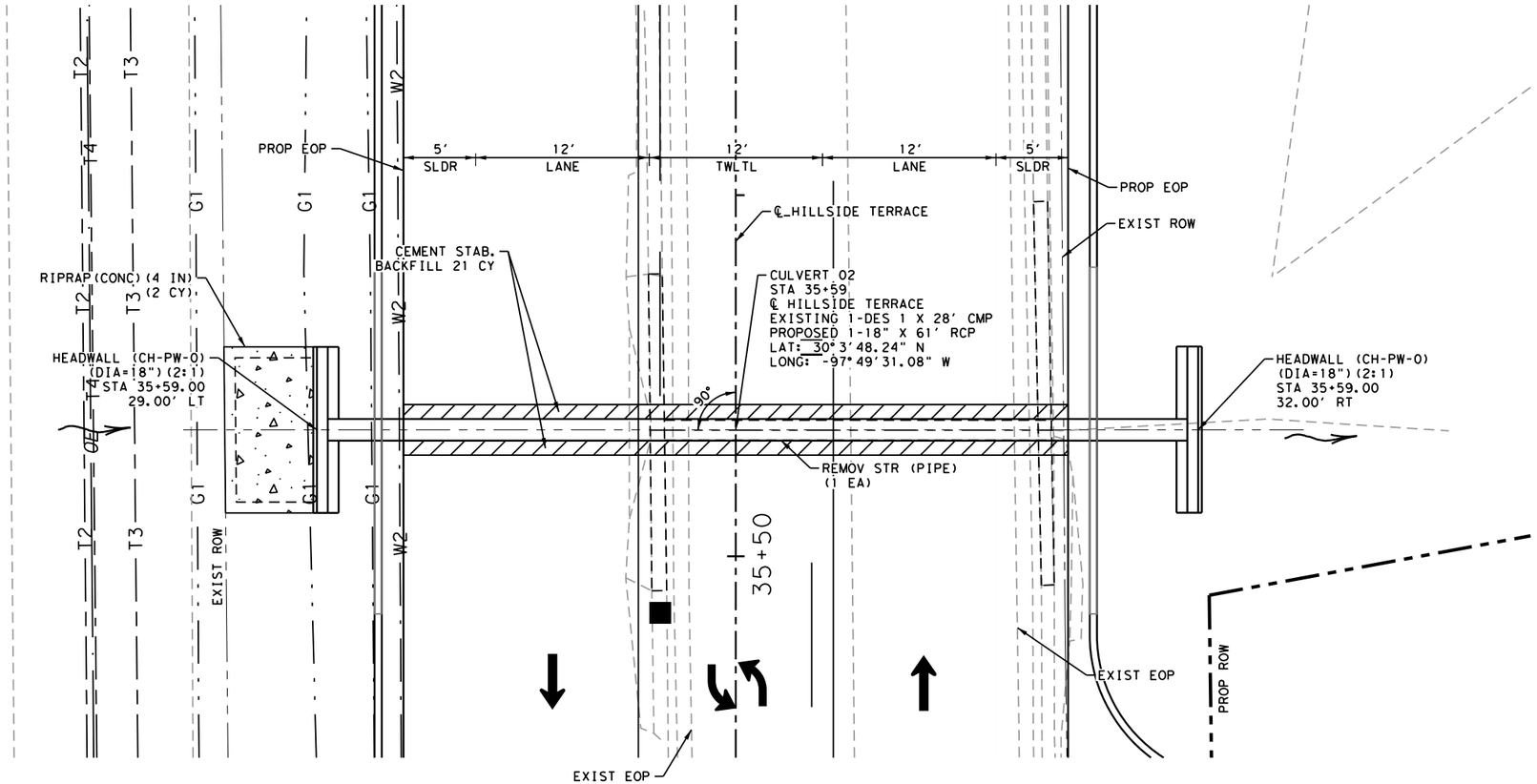
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HILLSIDE TERRACE

EXISTING CULVERT 01 STA 14+54

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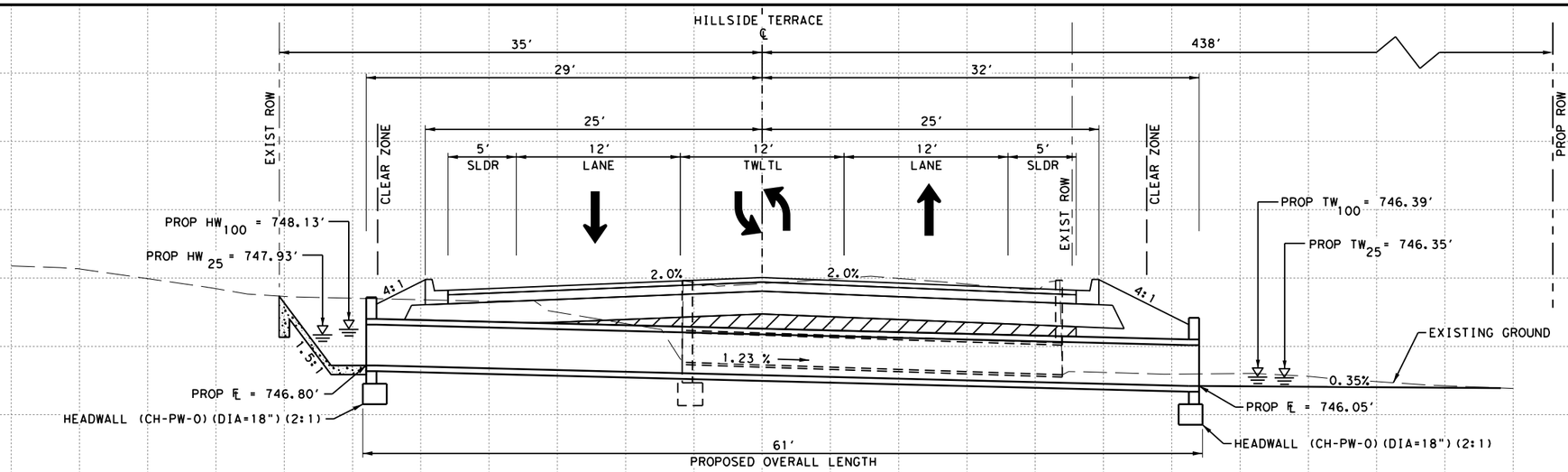


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

HORZ 0' 5' 10'
VERT 0' 2.5' 5'



CULVERT 02
STA 35+59

EXISTING 1 - DES 1 X 28' CMP
REMOVE EXISTING STRUCTURE
INSTALL 1-18" X 61 LF RCP (CL V)
INSTALL HEADWALL (CH-PW-O) (DIA=18") LT & RT
USING CH-PW-O, CRR

V_{25} =6.29 FT/S
Q_{25} =4.04 CFS
V_{100} =6.69 FT/S
Q_{100} =5.25 CFS

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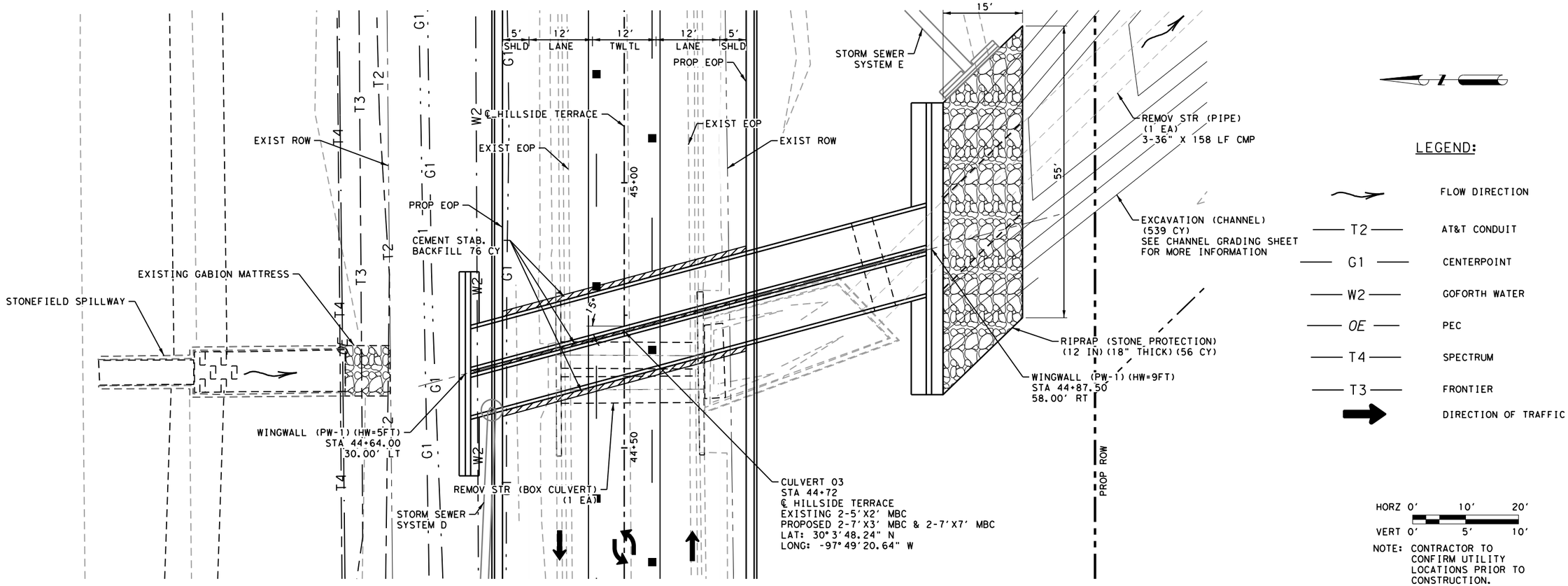
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HILLSIDE TERRACE

CULVERT 02
STA 35+59

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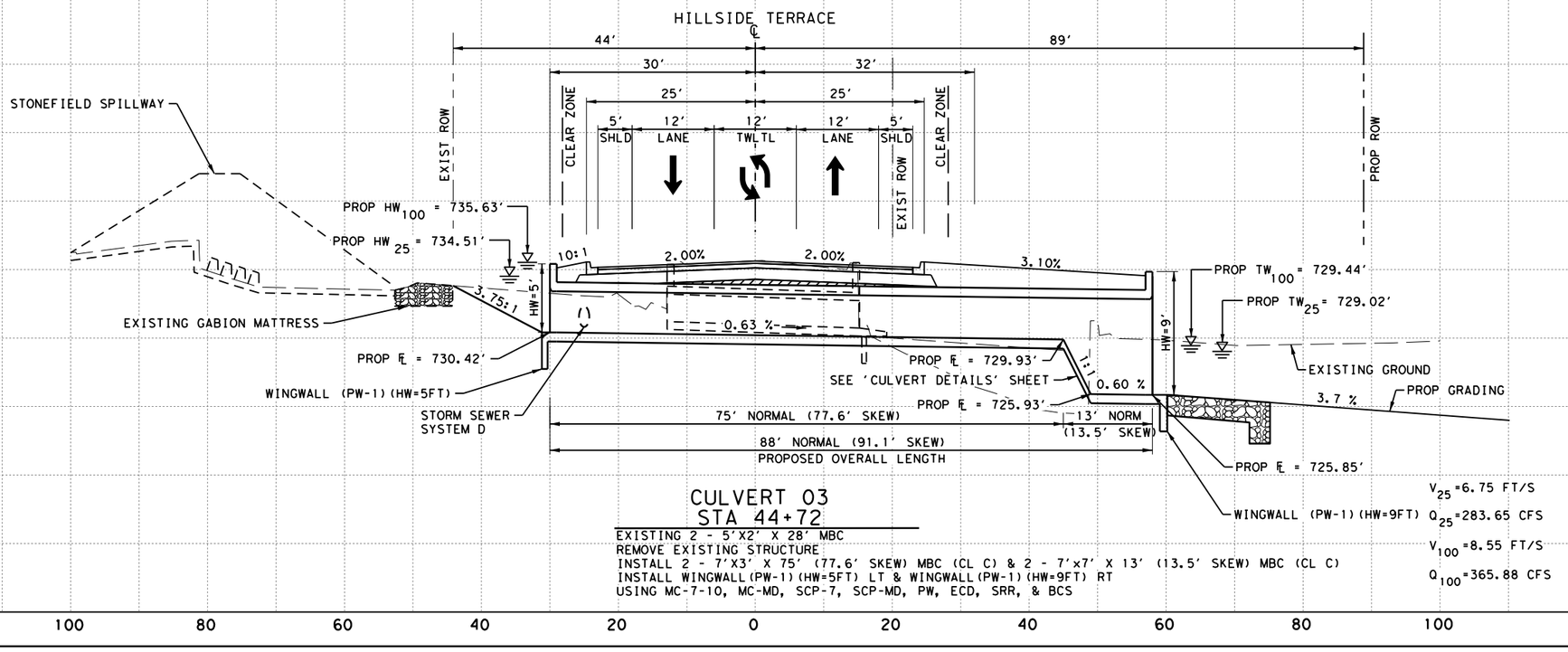


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

HORZ 0' 10' 20'
VERT 0' 5' 10'

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.



CULVERT 03
STA 44+72

EXISTING 2 - 5'X2' X 28' MBC
REMOVE EXISTING STRUCTURE
INSTALL 2 - 7'X3' X 75' (77.6' SKEW) MBC (CL C) & 2 - 7'x7' X 13' (13.5' SKEW) MBC (CL C)
INSTALL WINGWALL (PW-1) (HW=5FT) LT & WINGWALL (PW-1) (HW=9FT) RT
USING MC-7-10, MC-MD, SCP-7, SCP-MD, PW, ECD, SRR, & BCS

V_{25} =6.75 FT/S
Q_{25} =283.65 CFS
V_{100} =8.55 FT/S
Q_{100} =365.88 CFS

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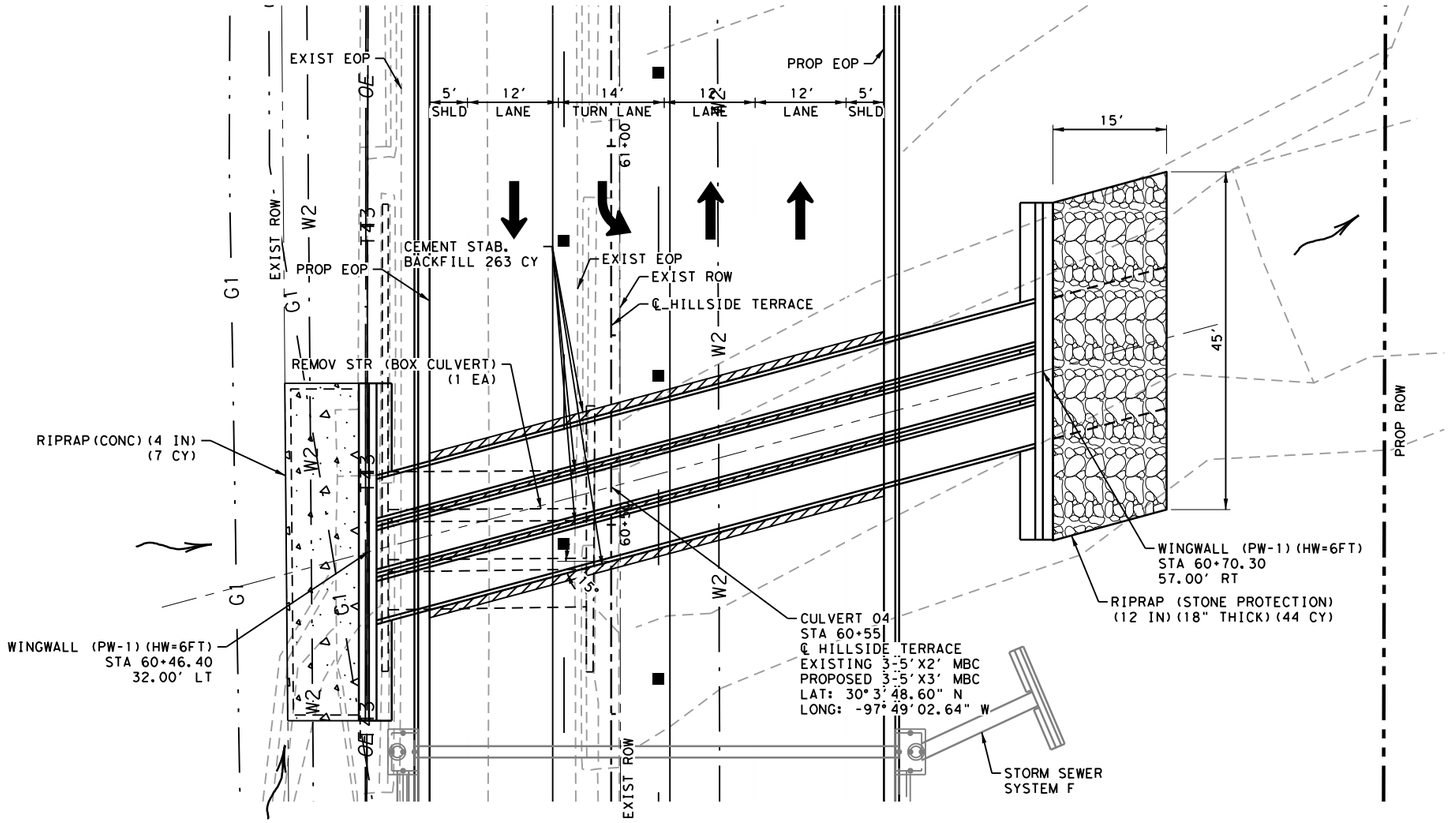
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HILLSIDE TERRACE

CULVERT 03
STA 44+72

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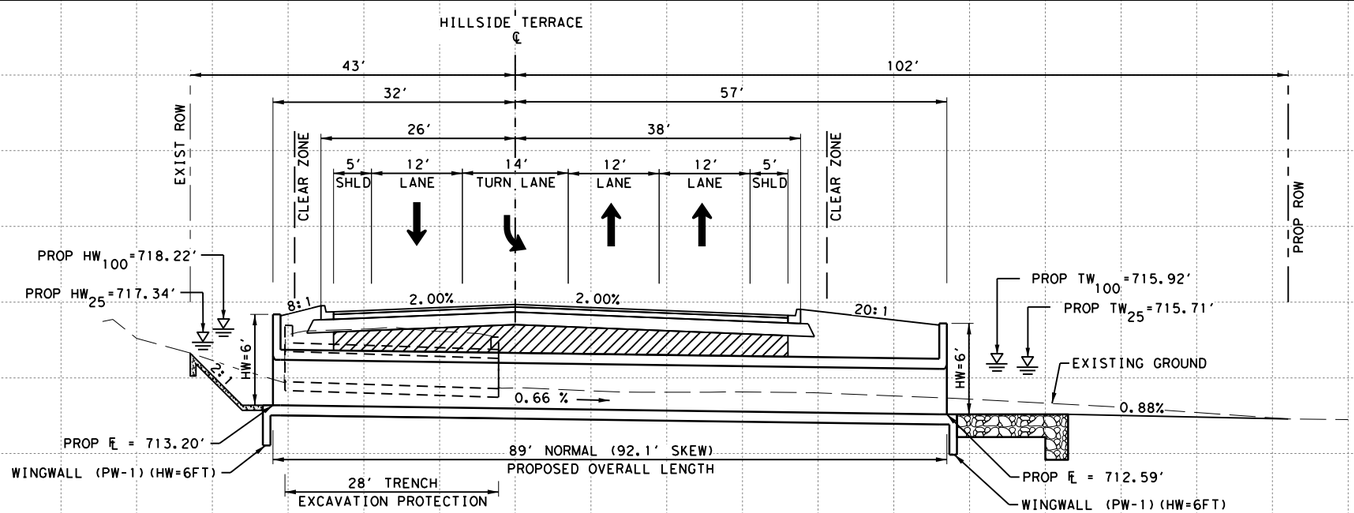


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

HORZ 0' 10' 20'
VERT 0' 5' 10'



CULVERT 04
STA 60+55

EXISTING 3 - 5'X2' X 28' MBC
REMOVE EXISTING STRUCTURE
INSTALL 3-5'X3' X 89' (92.1' SKEW) MBC (CL C)
INSTALL WINGWALL (PW-1) (HW=6FT) LT & RT
USING SCP-5, SCP-MD, PW, ECD, CRR, SRR, & BCS

V_{25}=7.08 FT/S
Q_{25}=318.39 CFS
V_{100}=9.10 FT/S
Q_{100}=409.49 CFS

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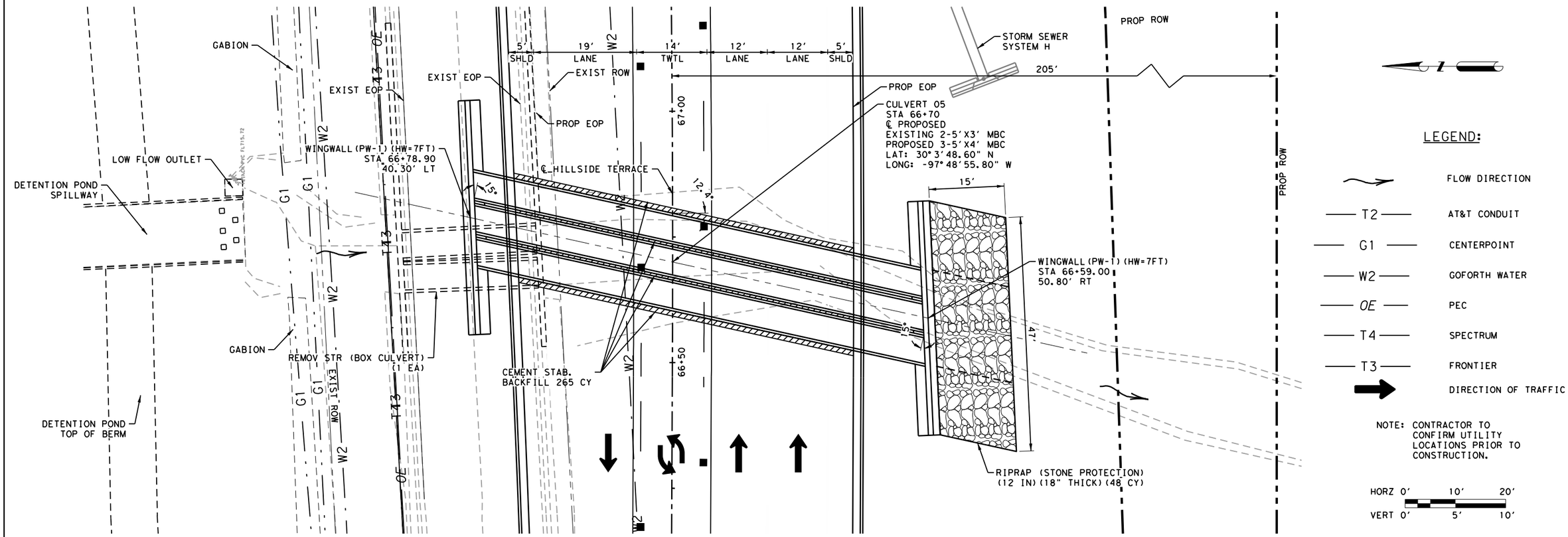
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HILLSIDE TERRACE

CULVERT 04
STA 60+55

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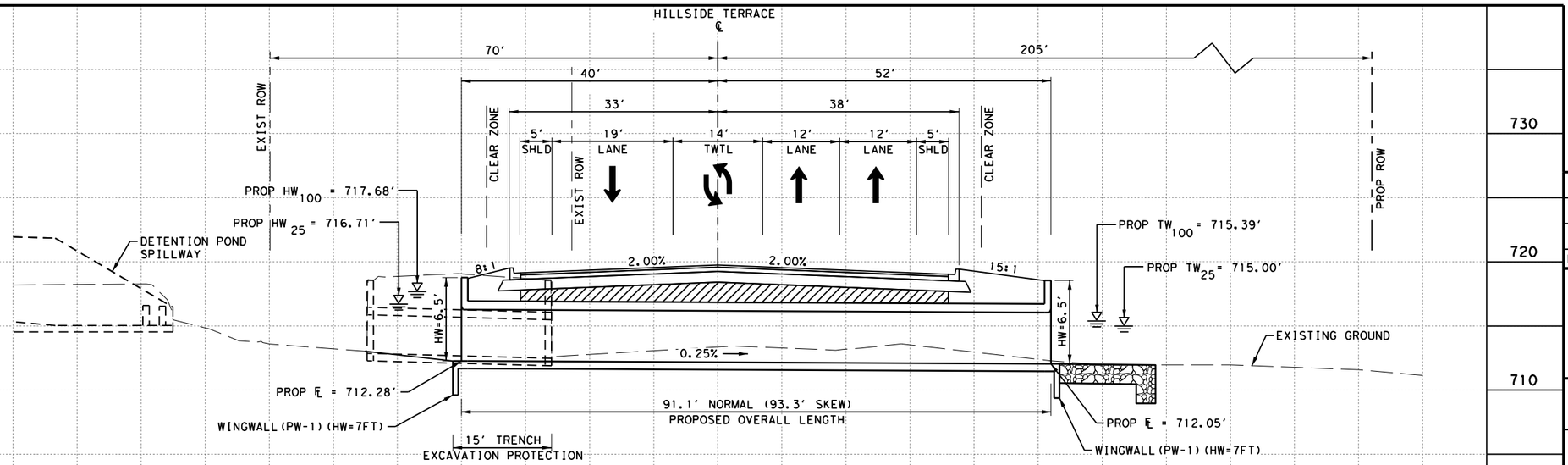


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

HORZ 0' 10' 20'
VERT 0' 5' 10'



CULVERT 05
STA 66+70

EXISTING 2 - 5'X3' X 29' MBC
REMOVE STRUCTURE
INSTALL 3-5'X4' X 91.1' (93.3' SKEW) MBC (CL C)
INSTALL WINGWALL (PW-1) (HW=7FT) LT & RT
USING SCP-5, SCP-MD, PW, ECD, SRR, & BCS

V_{25} = 7.96 FT/S
Q_{25} = 352.10 CFS
V_{100} = 9.05 FT/S
Q_{100} = 453.88 CFS

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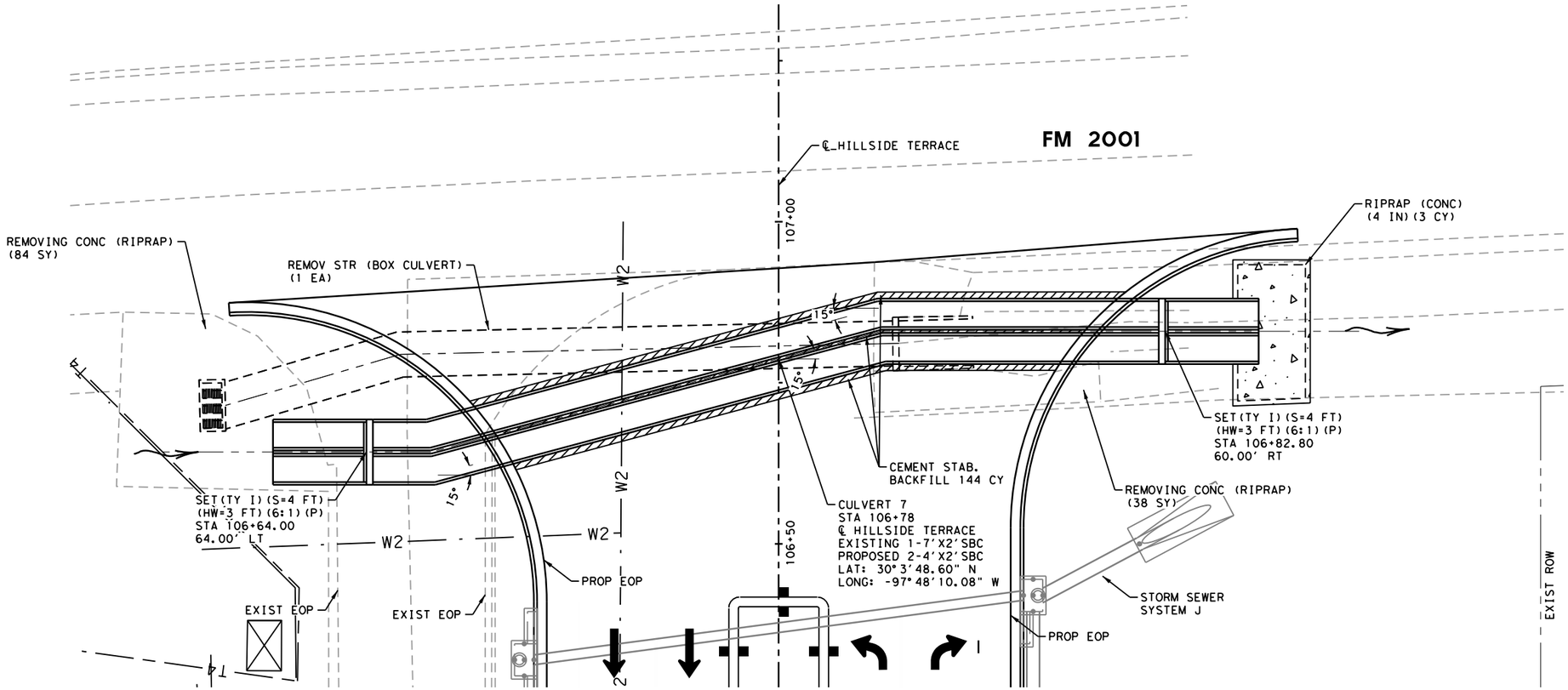
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HILLSIDE TERRACE

CULVERT 05
STA 66+70

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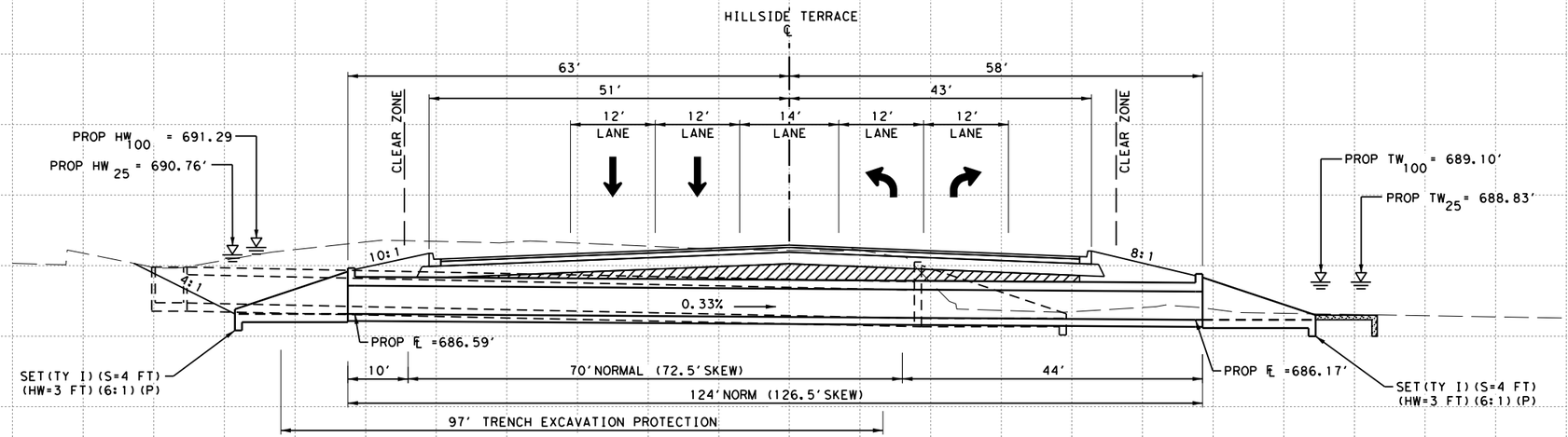


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

HORZ 0' 10 20'
VERT 0' 5' 10'



CULVERT 07
STA 106+78

EXISTING 1-7'X2' SBC W/ AREA INLET LT
REMOVE EXISTING STRUCTURE
INSTALL 2- 4'X2' X 124' (126.5' SKEW) SBC (CL C)
INSTALL SET (TY I) (S=4 FT) (HW=3 FT) (6:1) (P) LT & RT
USING SCP-6, SCP-MD, SETB-PD, CRR & BCS

V_{25} = 5.41 FT/S
Q_{25} = 114.93 CFS
V_{100} = 5.77FT/S
Q_{100} = 148.24 CFS

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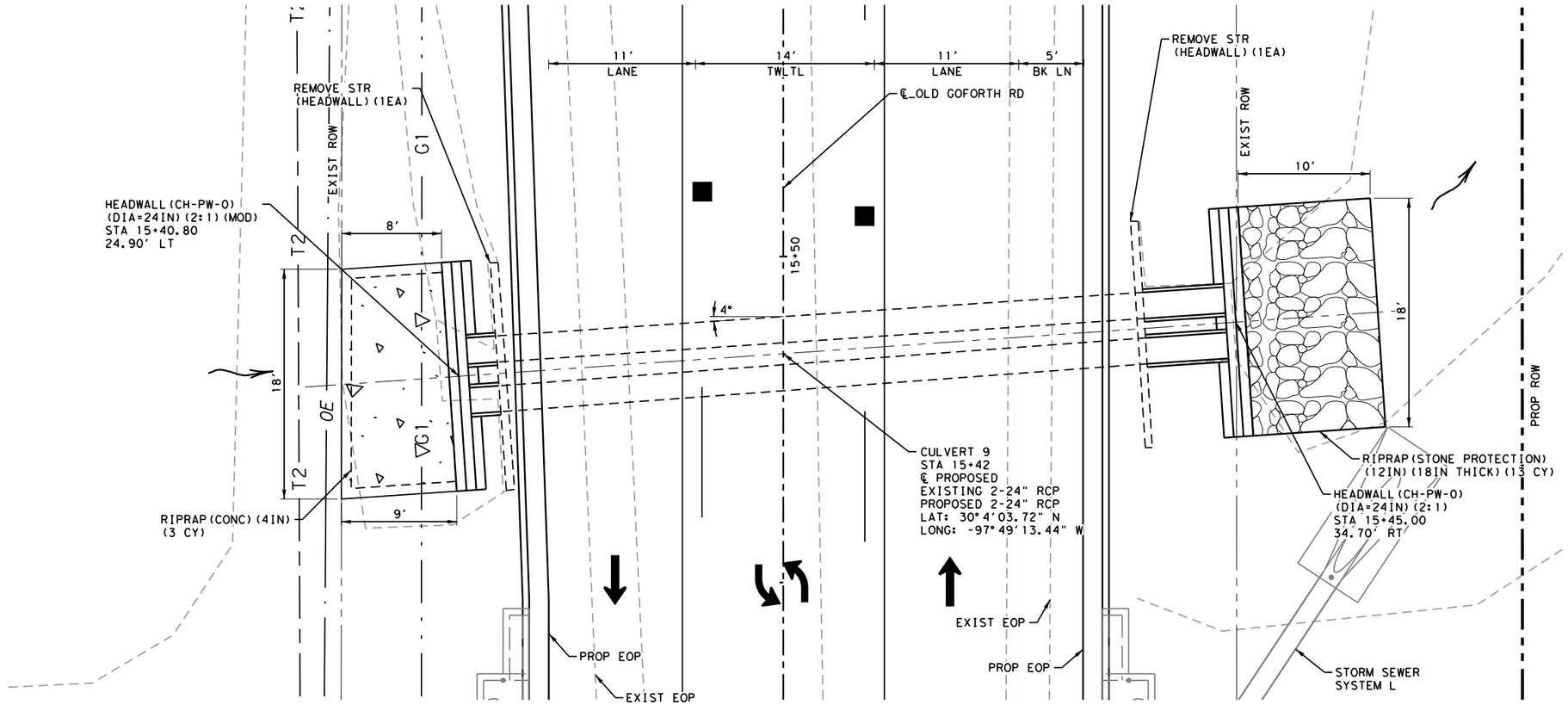
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HILLSIDE TERRACE

CULVERT 07
STA 106+78

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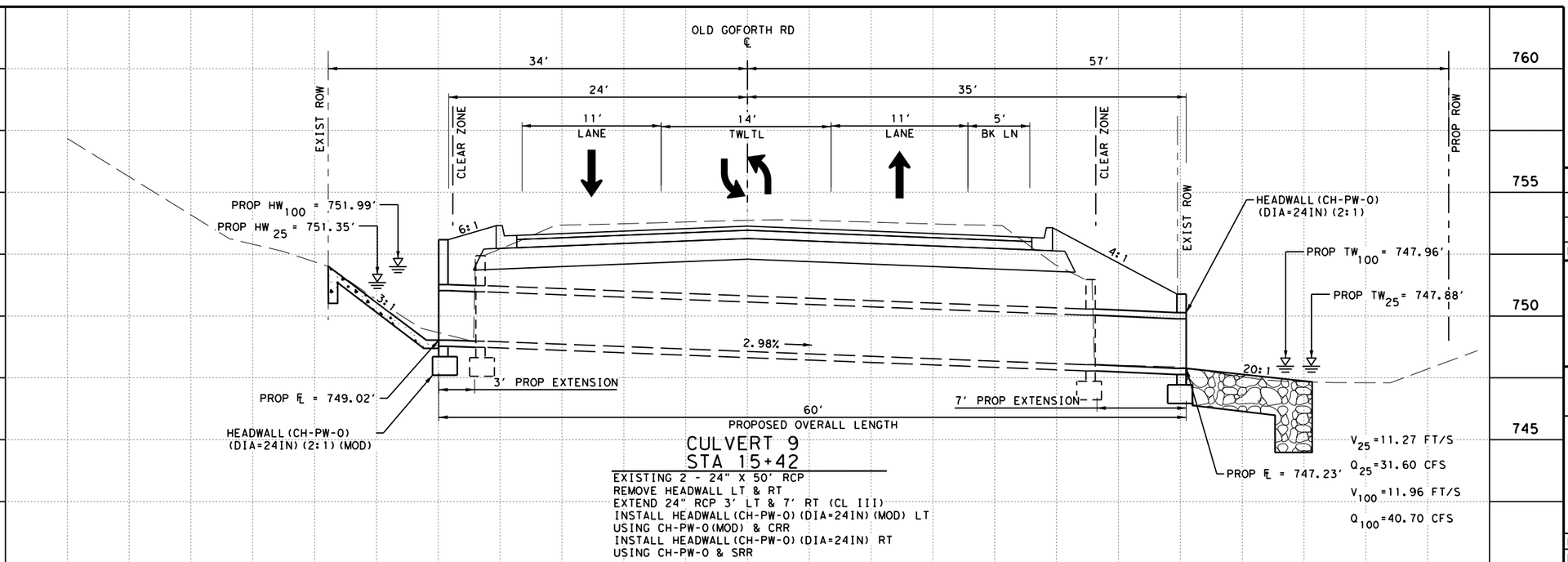


LEGEND:

- FLOW DIRECTION
- T2 — AT&T CONDUIT
- G1 — CENTERPOINT
- W2 — GOFORTH WATER
- OE — PEC
- T4 — SPECTRUM
- T3 — FRONTIER
- DIRECTION OF TRAFFIC

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

HORZ 0' 5' 10'
VERT 0' 2.5' 5'



CULVERT 9
STA 15+42

EXISTING 2 - 24" X 50' RCP
REMOVE HEADWALL LT & RT
EXTEND 24" RCP 3' LT & 7' RT (CL III)
INSTALL HEADWALL (CH-PW-O) (DIA=24IN) (MOD) LT
USING CH-PW-O (MOD) & CRR
INSTALL HEADWALL (CH-PW-O) (DIA=24IN) RT
USING CH-PW-O & SRR

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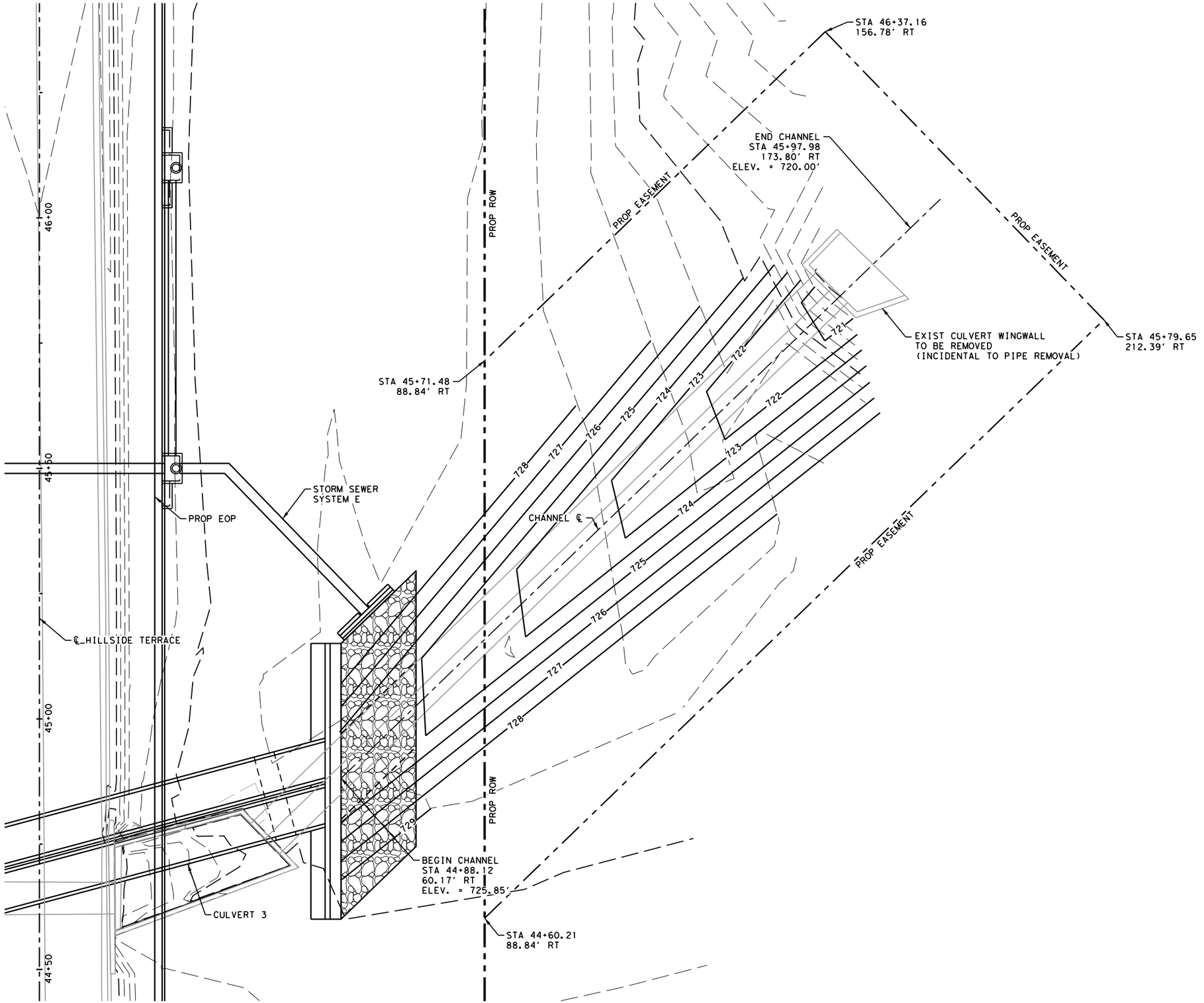
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OLD GOFORTH RD

CULVERT 09
STA 15+42

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LEGEND:

- PROPOSED ROW
- PROPOSED EASEMENT
- EXISTING CONTOURS
- PROPOSED CONTOURS

0 10 20
SCALE: 1"=20'

NOTE: CONTRACTOR TO CONFIRM UTILITY LOCATIONS PRIOR TO CONSTRUCTION.

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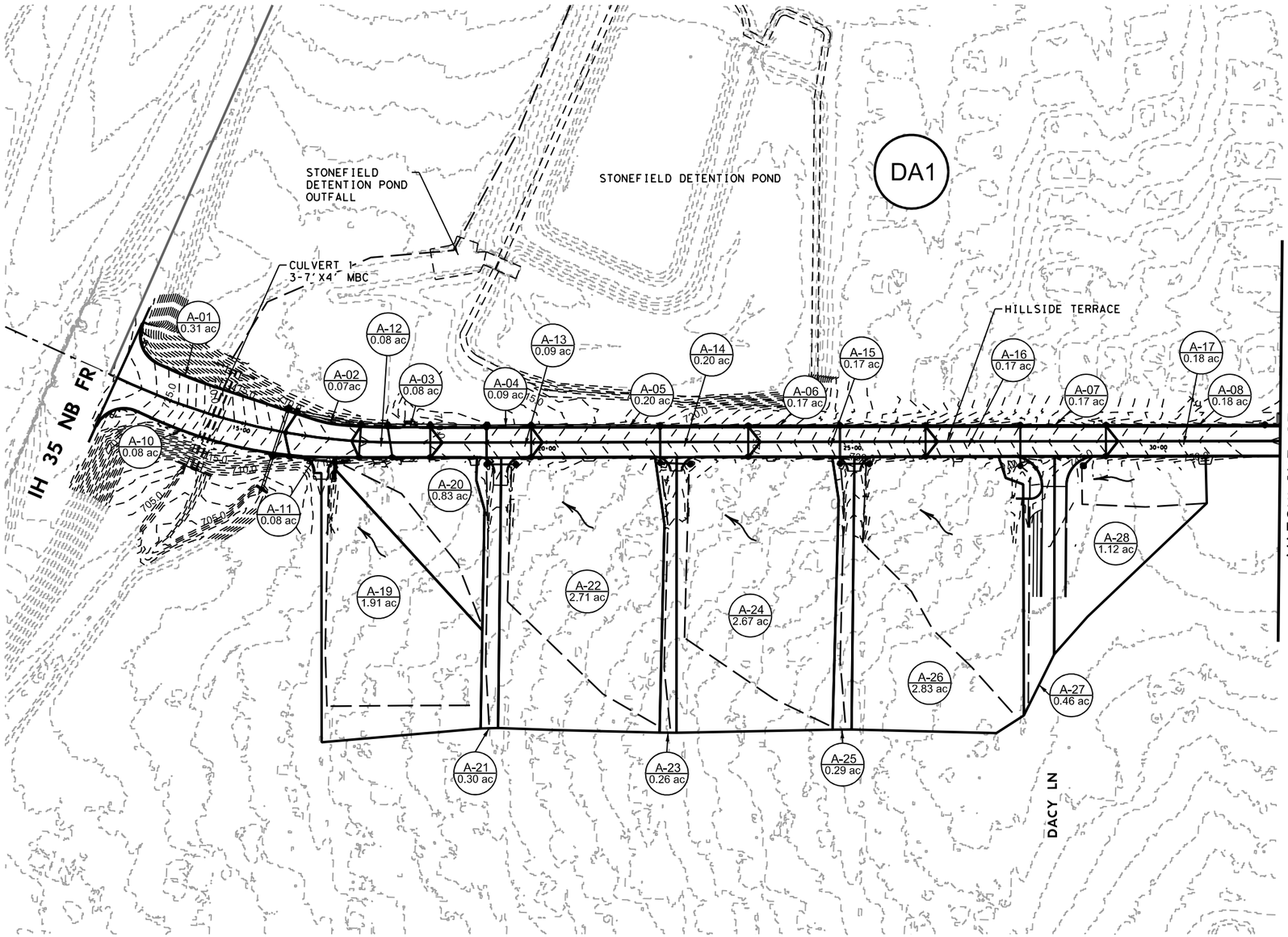
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HILLSIDE TERRACE

CULVERT 03 GRADING PLAN

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APPROVED BY:		

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DA# / XX.X ac — DRAINAGE AREA ID / DRAINAGE AREA (ACRES)

FLOW DIRECTION

EXIST 2-FT CONTOUTS

PROP 2-FT CONTOUR

ONSITE DRAINAGE AREA

OFFSITE DRAINAGE AREA

TIME OF CONCENTRATION

0 100 200

SCALE: 1"=200'

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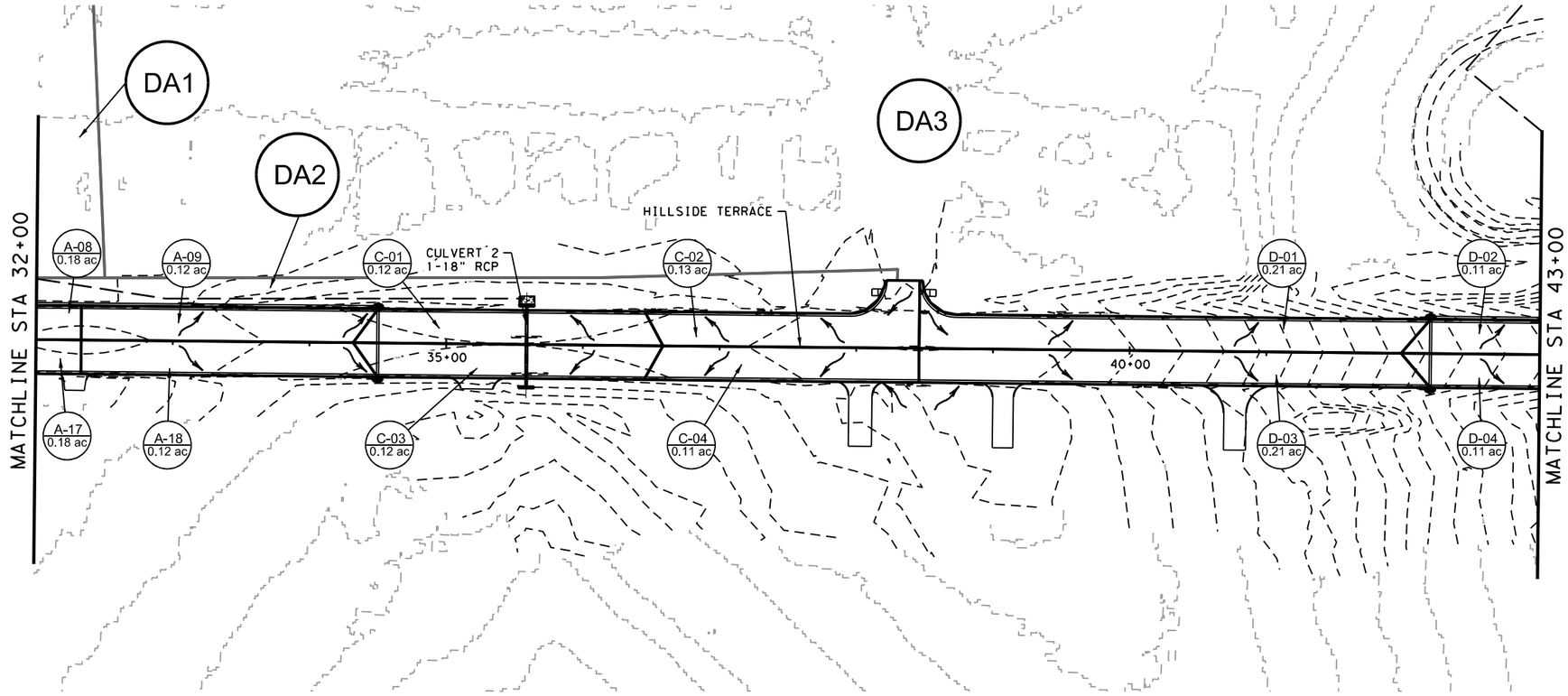
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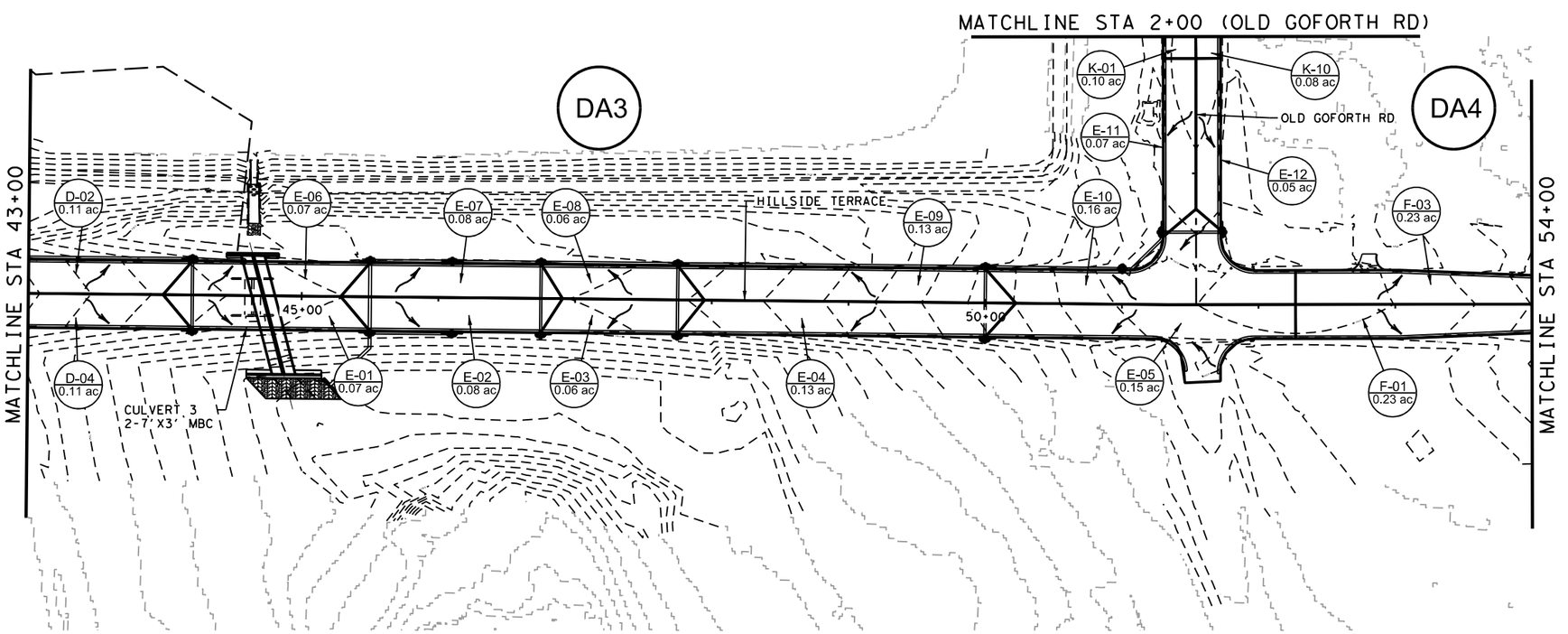
HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 1 OF 6
DRAWN BY:		150
CHECKED BY:		
APPROVED BY:		

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DA# / XX.X ac — DRAINAGE AREA ID / DRAINAGE AREA (ACRES)

FLOW DIRECTION

EXIST 2-FT CONTOUTS

PROP 2-FT CONTOUR

ONSITE DRAINAGE AREA

OFFSITE DRAINAGE AREA

TIME OF CONCENTRATION

0 50 100

SCALE: 1"=100'

PRELIMINARY
SUBMITTED FOR INTERIM REVIEW Under the authority of: JOHN W. TULEY, PE No 102441 DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

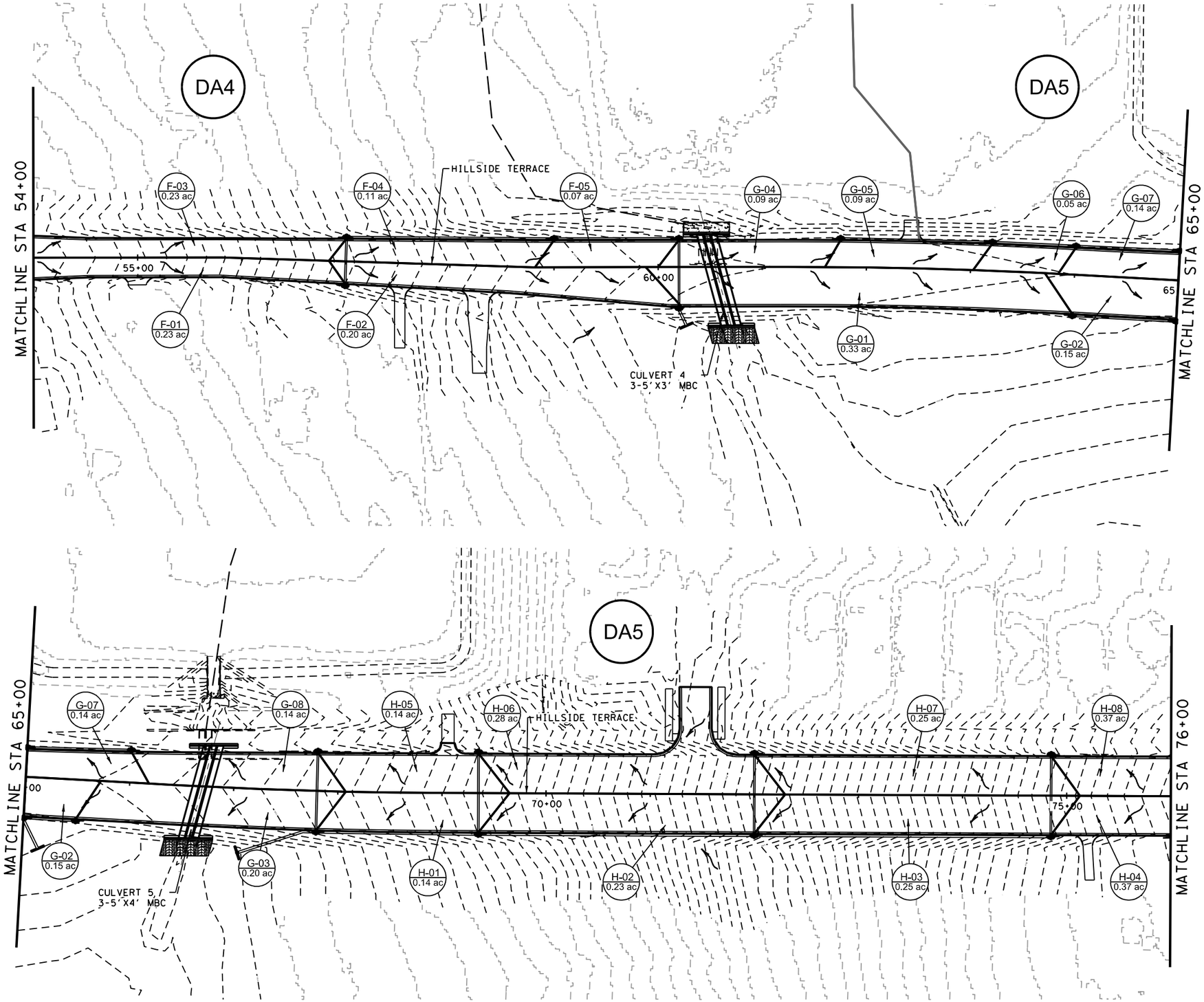
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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 2 OF 6
DRAWN BY:		
CHECKED BY:		151
APPROVED BY:		

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DA# / XX.X ac — DRAINAGE AREA ID / DRAINAGE AREA (ACRES)

FLOW DIRECTION

EXIST 2-FT CONTOUTS

PROP 2-FT CONTOUR

ONSITE DRAINAGE AREA

OFFSITE DRAINAGE AREA

TIME OF CONCENTRATION

0 50 100

SCALE: 1"=100'

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

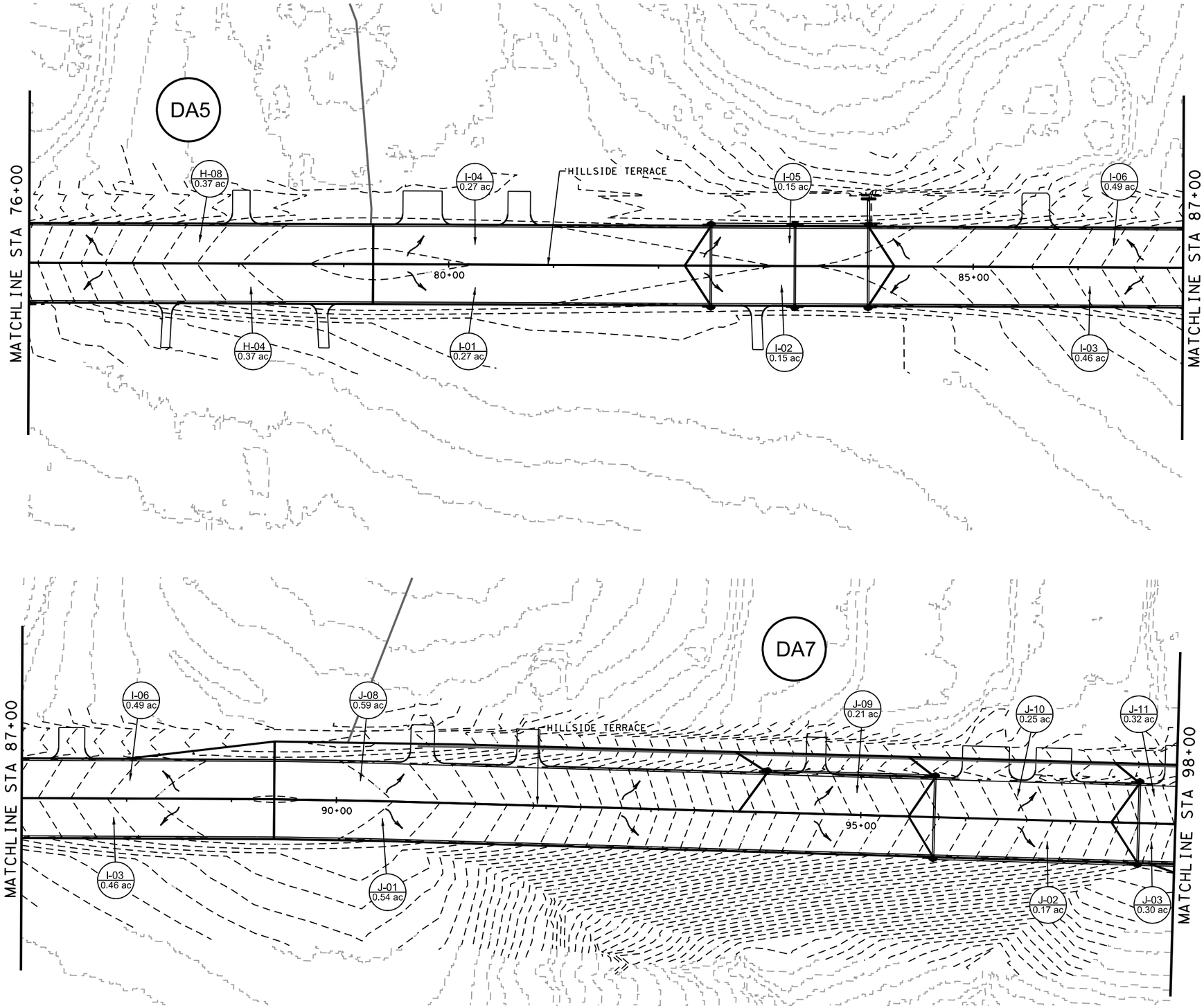
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HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 3 OF 6
DRAWN BY:		152
CHECKED BY:		
APPROVED BY:		

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DA#
XX.X ac

DRAINAGE AREA ID
DRAINAGE AREA (ACRES)
FLOW DIRECTION
EXIST 2-FT CONTOUTS
PROP 2-FT CONTOUR
ONSITE DRAINAGE AREA
OFFSITE DRAINAGE AREA
TIME OF CONCENTRATION

0 50 100
SCALE: 1"=100'

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

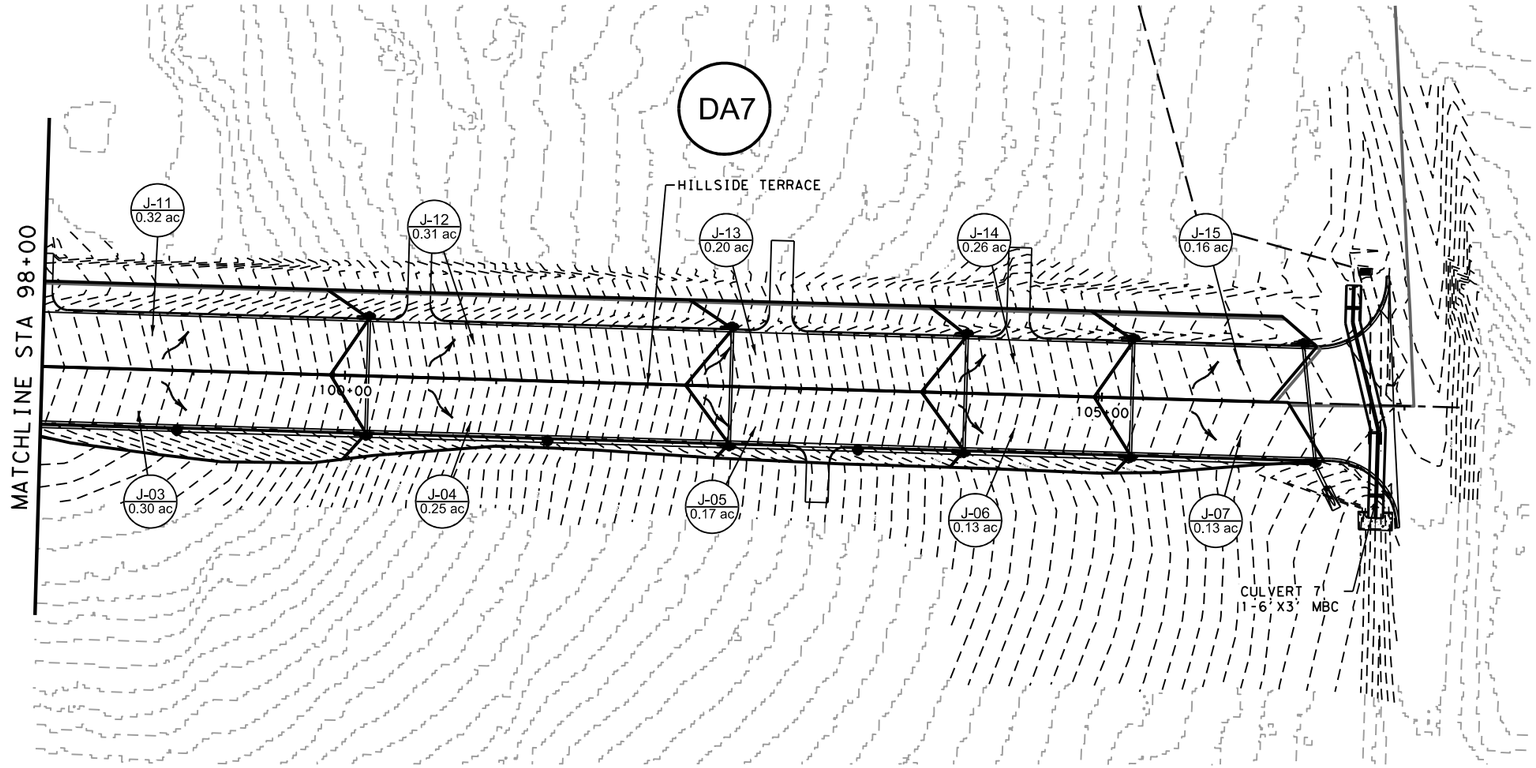
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HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 4 OF 6
DRAWN BY:		153
CHECKED BY:		
APPROVED BY:		

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DA#
XX.X ac

DRAINAGE AREA ID
DRAINAGE AREA (ACRES)

FLOW DIRECTION

EXIST 2-FT CONTOUTS

PROP 2-FT CONTOUR

ONSITE DRAINAGE AREA

OFFSITE DRAINAGE AREA

TIME OF CONCENTRATION

0 50 100

SCALE: 1"=100'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

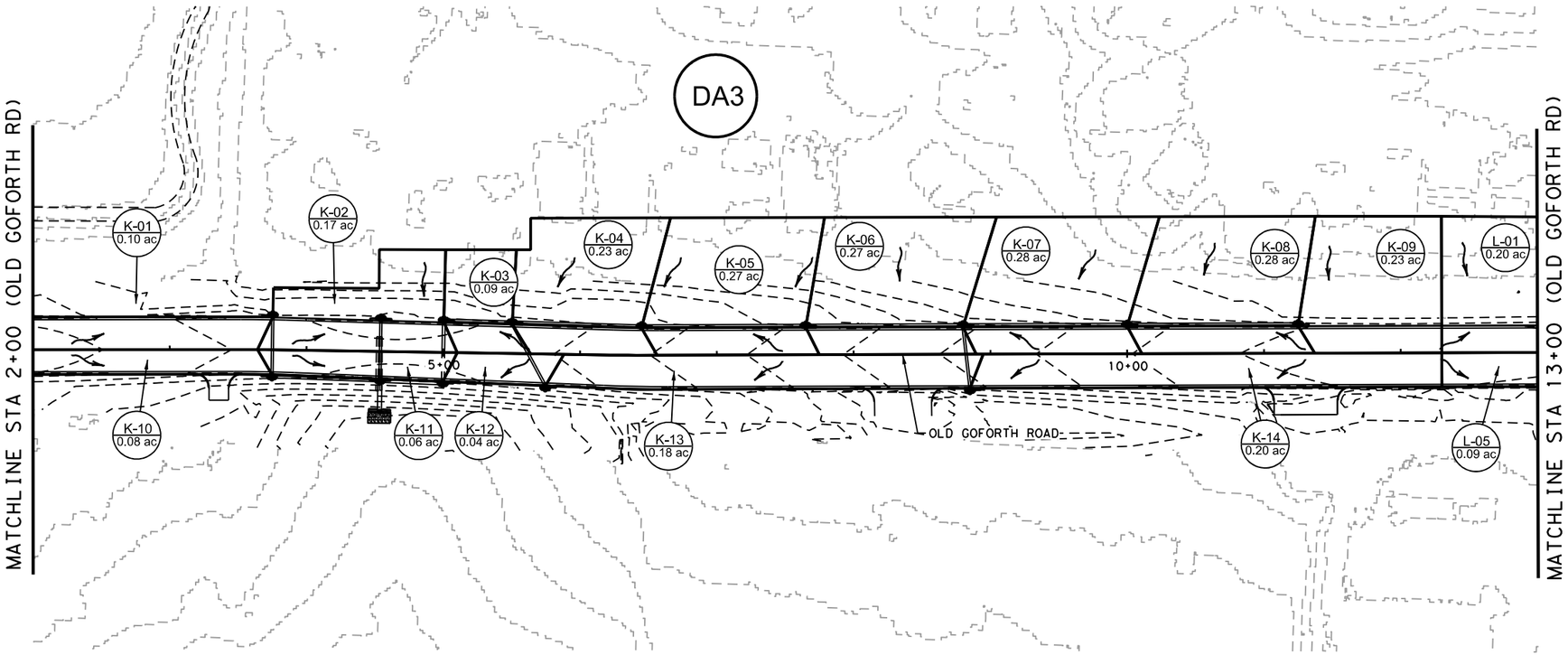
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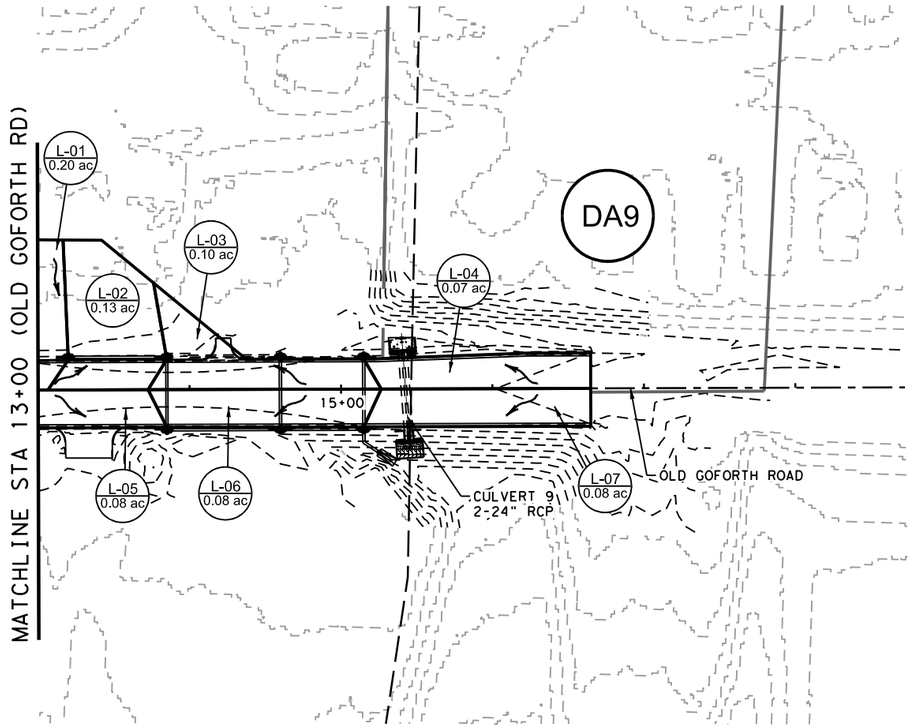
HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 5 OF 6
DRAWN BY:		
CHECKED BY:		154
APPROVED BY:		

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DA# / XX.X ac — DRAINAGE AREA ID / DRAINAGE AREA (ACRES)

FLOW DIRECTION

EXIST 2-FT CONTOUTS

PROP 2-FT CONTOUR

ONSITE DRAINAGE AREA

OFFSITE DRAINAGE AREA

TIME OF CONCENTRATION

0 50 100

SCALE: 1"=100'

PRELIMINARY

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1/27/2023

NO.	DATE	REVISION	APPROVED

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HILLSIDE TERRACE

PROPOSED STORM SEWER DRAINAGE AREA MAP

DESIGNED BY:		SHEET 6 OF 6
DRAWN BY:		
CHECKED BY:		155
APPROVED BY:		

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PROPOSED TIME OF CONCENTRATION CALCULATIONS																
DA	SHEET FLOW					SHALLOW CONCENTRATED FLOW					CHANNEL FLOW					TOTAL Tc (MIN)
	n	LENGTH (FT)	P2 (IN/HR)	SLOPE (FT/FT)	TIME (MIN)	PAVED/ UNPAVED	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	n	LENGTH (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TIME (MIN)	
A-19	0.15	100	4.19	0.04	6	Unpaved	135	0.030	2.8	1	0.04	388	0.018	3.1	2	10
A-20	0.15	100	4.19	0.03	7	Unpaved	255	0.031	2.9	1	NO CHANNEL FLOW					10
A-21	0.15	100	4.19	0.01	11	NO SHALLOW CONCENTRATED FLOW					0.04	324	0.028	4.8	1	12
A-22	0.15	100	4.19	0.03	7	Unpaved	218	0.041	3.3	1	0.04	222	0.025	5.0	1	10
A-23	0.15	100	4.19	0.01	11	NO SHALLOW CONCENTRATED FLOW					0.04	333	0.033	5.4	1	12
A-24	0.15	100	4.19	0.03	7	Unpaved	178	0.045	3.4	1	0.04	282	0.032	4.3	1	10
A-25	0.15	100	4.19	0.03	7	NO SHALLOW CONCENTRATED FLOW					0.04	322	0.034	3.7	1	10
A-26	0.15	100	4.19	0.02	10	Unpaved	272	0.042	3.3	1	0.04	128	0.039	4.9	0	11
A-27	0.15	100	4.19	0.01	11	N/A	0	0.000	0.0	0	0.04	295	0.027	4.3	1	12
A-28	0.15	100	4.19	0.02	9	Unpaved	166	0.054	3.8	1	NO CHANNEL FLOW					10

NOTE: A MINIMUM OF 10 MINUTE TIME OF CONCENTRATION WAS USED IN THE RATIONAL METHOD CALCULATIONS.

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

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HILLSIDE TERRACE

PROPOSED STORM SEWER HYDROLOGIC CALCULATIONS

DESIGNED BY:		SHEET 1 OF 2
DRAWN BY:		156
CHECKED BY:		
APPROVED BY:		

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Proposed Storm Sewer Discharge Summary										
Network	Area ID	C	Drainage Area (acres)	Tc (min)	I5 (in/hr)	I25 (in/hr)	I100 (in/hr)	Q5 (cfs)	Q25 (cfs)	Q100 (cfs)
A	A-01	0.90	0.31	10	6.22	9.21	11.96	1.75	2.59	3.36
	A-02	0.90	0.07	10	6.22	9.21	11.96	0.39	0.58	0.75
	A-03	0.90	0.08	10	6.22	9.21	11.96	0.42	0.62	0.81
	A-04	0.90	0.09	10	6.22	9.21	11.96	0.53	0.78	1.02
	A-05	0.90	0.20	10	6.22	9.21	11.96	1.14	1.69	2.20
	A-06	0.90	0.17	10	6.22	9.21	11.96	0.93	1.38	1.79
	A-07	0.90	0.17	10	6.22	9.21	11.96	0.95	1.40	1.82
	A-08	0.90	0.18	10	6.22	9.21	11.96	0.99	1.47	1.90
	A-09	0.90	0.12	10	6.22	9.21	11.96	0.67	0.99	1.28
	A-10	0.90	0.08	10	6.22	9.21	11.96	0.46	0.68	0.88
	A-11	0.90	0.08	10	6.22	9.21	11.96	0.46	0.68	0.88
	A-12	0.90	0.08	10	6.22	9.21	11.96	0.43	0.64	0.84
	A-13	0.90	0.09	10	6.22	9.21	11.96	0.53	0.78	1.02
	A-14	0.90	0.20	10	6.22	9.21	11.96	1.14	1.70	2.20
	A-15	0.90	0.17	10	6.22	9.21	11.96	0.93	1.38	1.79
	A-16	0.90	0.17	10	6.22	9.21	11.96	0.95	1.40	1.82
	A-17	0.90	0.18	10	6.22	9.21	11.96	0.99	1.46	1.90
	A-18	0.90	0.12	10	6.22	9.21	11.96	0.67	0.99	1.28
	A-19	0.62	1.91	10	6.22	9.21	11.96	7.43	11.00	14.29
	A-20	0.60	0.83	10	6.22	9.21	11.96	3.09	4.57	5.94
	A-21	0.60	0.30	12	5.81	8.64	11.29	1.03	1.54	2.01
	A-22	0.60	2.71	10	6.22	9.21	11.96	10.11	14.98	19.46
	A-23	0.78	0.26	12	5.81	8.64	11.29	1.16	1.73	2.26
	A-24	0.60	2.67	10	6.22	9.21	11.96	9.97	14.77	19.19
	A-25	0.80	0.29	10	6.22	9.21	11.96	1.45	2.15	2.79
	A-26	0.60	2.83	11	6.00	8.92	11.62	10.19	15.13	19.72
	A-27	0.71	0.46	12	5.81	8.64	11.29	1.90	2.82	3.69
	A-28	0.60	1.12	10	6.22	9.21	11.96	4.17	6.18	8.03
C	C-01	0.90	0.12	10	6.22	9.21	11.96	0.68	1.00	1.30
	C-02	0.90	0.13	10	6.22	9.21	11.96	0.72	1.07	1.39
	C-03	0.90	0.12	10	6.22	9.21	11.96	0.68	1.00	1.30
	C-04	0.90	0.11	10	6.22	9.21	11.96	0.62	0.92	1.20
D	D-01	0.90	0.21	10	6.22	9.21	11.96	1.19	1.76	2.29
	D-02	0.90	0.11	10	6.22	9.21	11.96	0.64	0.95	1.24
	D-03	0.90	0.21	10	6.22	9.21	11.96	1.17	1.73	2.24
	D-04	0.90	0.11	10	6.22	9.21	11.96	0.64	0.95	1.24
E	E-01	0.90	0.07	10	6.22	9.21	11.96	0.42	0.62	0.80
	E-02	0.90	0.08	10	6.22	9.21	11.96	0.46	0.68	0.89
	E-03	0.90	0.06	10	6.22	9.21	11.96	0.33	0.48	0.63
	E-04	0.90	0.13	10	6.22	9.21	11.96	0.73	1.08	1.40
	E-05	0.90	0.15	10	6.22	9.21	11.96	0.83	1.23	1.60
	E-06	0.90	0.07	10	6.22	9.21	11.96	0.42	0.62	0.80
	E-07	0.90	0.08	10	6.22	9.21	11.96	0.46	0.68	0.89
	E-08	0.90	0.06	10	6.22	9.21	11.96	0.33	0.48	0.63
	E-09	0.90	0.13	10	6.22	9.21	11.96	0.73	1.08	1.40
	E-10	0.90	0.16	10	6.22	9.21	11.96	0.92	1.37	1.78
	E-11	0.90	0.07	10	6.22	9.21	11.96	0.37	0.55	0.71
	E-12	0.90	0.05	10	6.22	9.21	11.96	0.27	0.40	0.52
F	F-01	0.90	0.23	10	6.22	9.21	11.96	1.27	1.88	2.44
	F-02	0.90	0.20	10	6.22	9.21	11.96	1.09	1.62	2.10
	F-03	0.90	0.23	10	6.22	9.21	11.96	1.26	1.87	2.42
	F-04	0.90	0.11	10	6.22	9.21	11.96	0.61	0.90	1.17
	F-05	0.90	0.07	10	6.22	9.21	11.96	0.40	0.59	0.77
G	G-01	0.90	0.33	10	6.22	9.21	11.96	1.85	2.74	3.56
	G-02	0.90	0.15	10	6.22	9.21	11.96	0.86	1.27	1.65
	G-03	0.90	0.20	10	6.22	9.21	11.96	1.14	1.69	2.19
	G-04	0.90	0.09	10	6.22	9.21	11.96	0.53	0.78	1.01
	G-05	0.90	0.09	10	6.22	9.21	11.96	0.48	0.71	0.93
	G-06	0.90	0.05	10	6.22	9.21	11.96	0.27	0.40	0.52
	G-07	0.90	0.14	10	6.22	9.21	11.96	0.76	1.13	1.46
	G-08	0.90	0.14	10	6.22	9.21	11.96	0.80	1.18	1.54

Proposed Storm Sewer Discharge Summary										
Network	Area ID	C	Drainage Area (acres)	Tc (min)	I5 (in/hr)	I25 (in/hr)	I100 (in/hr)	Q5 (cfs)	Q25 (cfs)	Q100 (cfs)
H	H-01	0.90	0.14	10	6.22	9.21	11.96	0.76	1.13	1.47
	H-02	0.90	0.23	10	6.22	9.21	11.96	1.29	1.91	2.49
	H-03	0.90	0.25	10	6.22	9.21	11.96	1.39	2.05	2.67
	H-04	0.90	0.37	10	6.22	9.21	11.96	2.09	3.10	4.03
	H-05	0.90	0.14	10	6.22	9.21	11.96	0.78	1.15	1.50
	H-06	0.90	0.28	10	6.22	9.21	11.96	1.59	2.35	3.05
	H-07	0.90	0.25	10	6.22	9.21	11.96	1.39	2.05	2.67
	H-08	0.90	0.37	10	6.22	9.21	11.96	2.09	3.10	4.03
I	I-01	0.90	0.27	10	6.22	9.21	11.96	1.51	2.24	2.91
	I-02	0.90	0.15	10	6.22	9.21	11.96	0.85	1.27	1.64
	I-03	0.90	0.46	10	6.22	9.21	11.96	2.58	3.82	4.96
	I-04	0.90	0.27	10	6.22	9.21	11.96	1.51	2.24	2.91
	I-05	0.90	0.15	10	6.22	9.21	11.96	0.85	1.27	1.64
	I-06	0.88	0.49	10	6.22	9.21	11.96	2.68	3.96	5.15
J	J-01	0.90	0.54	10	6.22	9.21	11.96	3.01	4.46	5.79
	J-02	0.90	0.17	10	6.22	9.21	11.96	0.95	1.40	1.82
	J-03	0.82	0.30	10	6.22	9.21	11.96	1.56	2.31	3.00
	J-04	0.84	0.25	10	6.22	9.21	11.96	1.33	1.97	2.56
	J-05	0.85	0.17	10	6.22	9.21	11.96	0.92	1.36	1.76
	J-06	0.83	0.13	10	6.22	9.21	11.96	0.66	0.97	1.26
	J-07	0.85	0.13	10	6.22	9.21	11.96	0.69	1.02	1.33
	J-08	0.80	0.59	10	6.22	9.21	11.96	2.93	4.33	5.63
	J-09	0.80	0.21	10	6.22	9.21	11.96	1.05	1.55	2.01
	J-10	0.81	0.25	10	6.22	9.21	11.96	1.27	1.88	2.44
	J-11	0.81	0.32	10	6.22	9.21	11.96	1.62	2.40	3.12
	J-12	0.80	0.31	10	6.22	9.21	11.96	1.53	2.27	2.95
	J-13	0.81	0.20	10	6.22	9.21	11.96	1.02	1.51	1.96
	J-14	0.80	0.14	10	6.22	9.21	11.96	0.71	1.06	1.38
	J-15	0.80	0.16	10	6.22	9.21	11.96	0.78	1.16	1.51
K	K-01	0.90	0.10	10	6.22	9.21	11.96	0.57	0.85	1.10
	K-02	0.72	0.17	10	6.22	9.21	11.96	0.76	1.13	1.46
	K-03	0.70	0.09	10	6.22	9.21	11.96	0.38	0.57	0.74
	K-04	0.66	0.23	10	6.22	9.21	11.96	0.93	1.38	1.79
	K-05	0.64	0.27	10	6.22	9.21	11.96	1.08	1.60	2.07
	K-06	0.65	0.27	10	6.22	9.21	11.96	1.11	1.64	2.13
	K-07	0.63	0.28	10	6.22	9.21	11.96	1.07	1.59	2.07
	K-08	0.64	0.28	10	6.22	9.21	11.96	1.10	1.63	2.12
	K-09	0.66	0.23	10	6.22	9.21	11.96	0.93	1.38	1.79
	K-10	0.90	0.08	10	6.22	9.21	11.96	0.43	0.64	0.83
	K-11	0.90	0.06	10	6.22	9.21	11.96	0.34	0.51	0.66
	K-12	0.90	0.04	10	6.22	9.21	11.96	0.22	0.32	0.42
	K-13	0.90	0.18	10	6.22	9.21	11.96	0.98	1.46	1.89
	K-14	0.90	0.20	10	6.22	9.21	11.96	1.09	1.62	2.10
L	L-01	0.63	0.20	10	6.22	9.21	11.96	0.78	1.15	1.50
	L-02	0.62	0.13	10	6.22	9.21	11.96	0.50	0.74	0.96
	L-03	0.81	0.10	10	6.22	9.21	11.96	0.48	0.71	0.92
	L-04	0.90	0.07	10	6.22	9.21	11.96	0.41	0.61	0.79
	L-05	0.90	0.09	10	6.22	9.21	11.96	0.48	0.71	0.92
	L-06	0.90	0.08	10	6.22	9.21	11.96	0.46	0.67	0.88
	L-07	0.90	0.08	10	6.22	9.21	11.96	0.46	0.69	0.89

NOTE: A MINIMUM OF 10 MINUTE TIME OF CONCENTRATION WAS USED IN THE RATIONAL METHOD CALCULATIONS.

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

PROPOSED STORM SEWER HYDROLOGIC CALCULATIONS

DESIGNED BY:		SHEET 2 OF 2
DRAWN BY:		157
CHECKED BY:		
APPROVED BY:		

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5-YR Proposed Storm Sewer Inlet Computations												
Network	Inlet ID	Inlet Type	Profile Type	Inlet Discription	Inlet Discharge (cfs)	Inlet Capacity (cfs)	Bypass To	Bypass Flow (cfs)	Allowable Ponded Width (ft)	Ponded Width (ft)	Allowable Ponded Depth (ft)	Ponded Depth (ft)
A	A-01	Curb	On Grade	PCO 15'	1.75	1.74	A-02	0.01	6.50	6.48	0.13	0.13
	A-05	Curb	On Grade	PCO 10'	1.15	1.12	A-04	0.03	6.50	5.80	0.13	0.12
	A-06	Curb	On Grade	PCO 10'	0.95	0.94	A-05		6.50	5.35	0.13	0.11
	A-07	Curb	On Grade	PCO 10'	0.95	0.94	A-06	0.02	6.50	5.11	0.13	0.10
	A-08	Curb	On Grade	PCO 10'	0.99	0.98	A-07	0.01	6.50	5.50	0.13	0.11
	A-09	Curb	On Grade	PCO 10'	0.67	0.67	C-01		6.50	6.33	0.13	0.13
	A-10	Curb	On Grade	PCO 15'	0.46	0.46	A-11		6.50	4.00	0.13	0.08
	A-14	Curb and Grate	On Grade	PCU 10'	1.19	1.11	A-13	0.08	6.50	5.89	0.13	0.12
	A-15	Curb and Grate	On Grade	PCU 10'	0.99	0.94	A-14	0.05	6.50	5.44	0.13	0.11
	A-16	Curb and Grate	On Grade	PCU 10'	0.99	0.94	A-15	0.06	6.50	5.19	0.13	0.10
	A-17	Curb and Grate	On Grade	PCU 10'	0.99	0.94	A-16	0.05	6.50	5.50	0.13	0.11
	A-18	Curb	On Grade	PCO 10'	0.67	0.67	C-03		6.50	6.33	0.13	0.13
C	C-02	Curb	On Grade	Sawtooth Curb	0.72	0.72	C-01		6.50	6.43	0.13	0.13
	C-04	Curb	On Grade	Sawtooth Curb	0.62	0.62	C-03		6.50	6.09	0.13	0.12
D	D-01	Curb	On Grade	PCO 10'	1.19	1.12	D-02	0.07	6.50	5.60	0.13	0.11
	D-02	Curb	On Grade	PCO 10'	0.71	0.71	E-06		6.50	5.27	0.13	0.11
	D-03	Curb	On Grade	PCO 10'	1.17	1.11	D-04	0.06	6.50	5.56	0.13	0.11
	D-04	Curb	On Grade	PCO 10'	0.70	0.70	E-01		6.50	5.25	0.13	0.11
E	E-04	Curb	On Grade	PCO 10'	0.73	0.73	E-03		6.50	5.51	0.13	0.11
	E-05	Curb	On Grade	PCO 10'	0.83	0.83	E-04		6.50	5.08	0.13	0.10
	E-09	Curb	On Grade	PCO 10'	0.73	0.73	E-08		6.50	5.51	0.13	0.11
	E-10	Curb	On Grade	PCO 10'	0.92	0.92	E-09		6.50	5.29	0.13	0.11
	E-11	Curb	On Grade	PCO 10'	0.37	0.37	E-10		12.50	4.02	0.25	0.08
	E-12	Curb	On Grade	PCO 10'	0.27	0.27	E-10		6.50	3.59	0.13	0.07
F	F-01	Curb	On Grade	PCO 10'	1.27	1.14	F-02	0.12	6.50	5.46	0.13	0.11
	F-02	Curb	On Grade	PCO 10'	1.22	1.22	G-01		18.50	7.69	0.37	0.15
	F-03	Curb	On Grade	PCO 10'	1.26	1.14	F-04	0.12	6.50	5.45	0.13	0.11
	F-04	Curb	On Grade	PCO 10'	0.73	0.73	F-05		6.50	5.12	0.13	0.10
	F-05	Curb	On Grade	PCO 10'	0.40	0.40	G-04		6.50	5.06	0.13	0.10
G	G-04	Curb	On Grade	PCO 10'	0.53	0.53	G-05		6.50	6.40	0.13	0.13
	G-05	Curb	On Grade	PCO 10'	0.48	0.48	G-06		6.50	6.19	0.13	0.12
H	H-01	Curb	On Grade	PCO 10'	1.17	1.11	G-03	0.06	18.50	5.58	0.37	0.11
	H-02	Curb	On Grade	PCO 10'	1.86	1.45	H-01	0.40	18.50	6.17	0.37	0.12
	H-03	Curb	On Grade	PCO 10'	1.99	1.43	H-02	0.57	18.50	5.90	0.37	0.12
	H-04	Curb	On Grade	PCO 10'	2.09	1.49	H-03	0.61	18.50	6.10	0.37	0.12
	H-05	Curb	On Grade	PCO 10'	1.34	1.24	G-08	0.10	6.50	5.96	0.13	0.12
	H-06	Curb	On Grade	PCO 10'	2.15	1.59	H-05	0.56	18.50	6.52	0.37	0.13
	H-07	Curb	On Grade	PCO 10'	1.99	1.43	H-06	0.57	18.50	5.90	0.37	0.12
	H-08	Curb	On Grade	PCO 10'	2.09	1.49	H-07	0.61	18.50	6.10	0.37	0.12
J	J-01	Curb	On Grade	PCO 10'	3.01	2.07	J-02	0.94	18.50	7.97	0.37	0.16
	J-02	Curb	On Grade	PCO 10'	1.89	1.45	J-03	0.43	18.50	6.14	0.37	0.12
	J-03	Curb	On Grade	PCO 10'	1.99	1.37	J-04	0.62	18.50	5.66	0.37	0.11
	J-04	Curb	On Grade	PCO 10'	1.95	1.35	J-05	0.59	18.50	5.60	0.37	0.11
	J-05	Curb	On Grade	PCO 10'	1.51	1.16	J-06	0.35	18.50	5.10	0.37	0.10
	J-06	Curb	On Grade	PCO 10'	1.00	0.93	J-07	0.07	18.50	4.69	0.37	0.09
	J-07	Curb	On Grade	PCO 10'	0.77	0.77			18.50	4.82	0.37	0.10
	J-08	Curb	On Grade	PCO 10'	2.93	1.94	J-09	0.99	18.50	7.46	0.37	0.15
	J-09	Curb	On Grade	PCO 10'	2.04	1.63	J-10	0.40	18.50	6.88	0.37	0.14
	J-10	Curb	On Grade	PCO 10'	1.67	1.35	J-11	0.32	18.50	5.87	0.37	0.12
	J-11	Curb	On Grade	PCO 10'	1.95	1.36	J-12	0.59	18.50	5.61	0.37	0.11
	J-12	Curb	On Grade	PCO 10'	2.12	1.42	J-13	0.70	18.50	5.79	0.37	0.12
	J-13	Curb	On Grade	PCO 10'	1.72	1.26	J-14	0.46	18.50	5.36	0.37	0.11
	J-14	Curb	On Grade	PCO 10'	1.18	1.04	J-15	0.13	18.50	4.98	0.37	0.10
	J-15	Curb	On Grade	PCO 15'	0.92	0.92			18.50	5.09	0.37	0.10
K	K-04	Curb	On Grade	PCO 10'	0.93	0.93	K-03		6.50	6.45	0.13	0.13
	K-05	Curb	On Grade	PCO 10'	1.08	1.08	K-04		6.50	6.44	0.13	0.13
	K-06	Curb	On Grade	PCO 10'	1.11	1.11	K-05		6.50	6.50	0.13	0.13
	K-07	Curb	On Grade	PCO 10'	1.07	1.07	K-06		6.50	6.43	0.13	0.13
	K-08	Curb	On Grade	PCO 10'	1.10	1.10	K-07		6.50	6.50	0.13	0.13
	K-09	Curb	On Grade	PCO 10'	0.93	0.93	K-08		6.50	6.33	0.13	0.13
	K-13	Curb	On Grade	PCO 10'	0.98	0.98	K-12		6.50	6.27	0.13	0.13
	K-14	Curb	On Grade	PCO 10'	1.09	1.09	K-13		6.50	6.47	0.13	0.13
L	L-01	Curb	On Grade	PCO 10'	0.78	0.78	L-02		6.50	6.48	0.13	0.13

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Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

PROPOSED STORM SEWER HYDRAULIC DATA

DESIGNED BY:		SHEET 1 OF 4
DRAWN BY:		
CHECKED BY:		158
APPROVED BY:		

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25-YR Proposed Storm Sewer Inlet Computations

Network	Inlet ID	Inlet Type	Profile Type	Inlet Discription	Inlet Discharge (cfs)	Inlet Capacity (cfs)	Bypass To	Bypass Flow (cfs)	Allowable Ponded Width (ft)	Ponded Width (ft)	Allowable Ponded Depth (ft)	Ponded Depth (ft)
A	A-02	Curb	On Grade	PCO 15'	0.78	0.78	A-03		6.50	6.02	0.13	0.12
	A-03	Curb	Sag	PCO 10'	0.62	1.32			6.50	3.95	0.13	0.08
	A-04	Curb	On Grade	PCO 10'	1.04	1.04	A-03		6.50	6.49	0.13	0.13
	A-11	Curb and Grate	On Grade	PCU 10'	0.68	0.68	A-12		6.50	5.73	0.13	0.11
	A-12	Curb and Grate	Sag	PCU 5'	0.68	1.39			6.50	7.38	0.13	0.15
	A-13	Curb and Grate	On Grade	PCU 10'	1.05	1.02	A-12	0.03	6.50	6.50	0.13	0.13
	A-19	Headwall	Sag	24" SET								
	A-20	Headwall	Sag	24" SET								
	A-21	Grate	Sag	3' x 3' Inlet	1.54	18.93			12.00	2.30	1.20	0.20
	A-22	Grate	Sag	4' x 4' Inlet	14.98	44.58			14.00	5.63	2.00	0.75
	A-23	Grate	Sag	3' x 3' Inlet	1.73	27.32			10.00	2.36	2.50	0.22
	A-24	Grate	Sag	4' x 4' Inlet	14.77	49.84			10.00	5.93	2.50	0.74
	A-25	Grate	Sag	3' x 3' Inlet	2.15	27.32			10.00	2.16	2.50	0.25
	A-26	Grate	Sag	4' x 4' Inlet	15.13	40.74			10.00	4.52	1.67	0.75
	A-27	Grate	Sag	3' x 3' Inlet	2.82	27.32			10.00	2.42	2.50	0.30
	A-28	Grate	Sag	5' x 5' Inlet	6.18	79.16			10.00	7.04	2.50	0.35
C	C-01	Curb	Sag	Sawtooth Curb	1.00	1.37			6.50	5.28	0.13	0.11
	C-03	Curb	Sag	Sawtooth Curb	1.00	1.37			6.50	5.28	0.13	0.11
E	E-01	Curb	On Grade	PCO 10'	0.63	0.63	E-02		6.50	6.20	0.13	0.12
	E-02	Curb	Sag	PCO 15'	0.68	1.80			6.50	3.41	0.13	0.07
	E-03	Curb	On Grade	PCO 10'	0.48	0.48	E-02		6.50	5.67	0.13	0.11
	E-06	Curb	On Grade	PCO 10'	0.63	0.63	E-07		6.50	6.21	0.13	0.12
	E-07	Curb	Sag	PCO 15'	0.68	1.80			6.50	3.41	0.13	0.07
	E-08	Curb	On Grade	PCO 10'	0.49	0.49	E-07		6.50	5.67	0.13	0.11
G	G-01	Curb	On Grade	PCO 10'	2.80	2.69	G-02	0.10	18.50	11.96	0.37	0.24
	G-02	Curb	Sag	PCO 15'	1.40	8.64			18.50	5.50	0.37	0.11
	G-03	Curb	On Grade	PCO 10'	2.28	2.25	G-02	0.03	18.50	10.76	0.37	0.22
	G-06	Curb	On Grade	PCO 10'	0.40	0.40	G-07		6.50	5.77	0.13	0.12
	G-07	Curb	Sag	PCO 15'	1.22	1.80			6.50	5.03	0.13	0.10
	G-08	Curb	On Grade	PCO 10'	1.93	1.83	G-07	0.10	10.00	8.49	0.20	0.17
I	I-01	Curb	On Grade	PCO 10'	2.24	2.23	I-02	0.01	18.50	11.00	0.37	0.22
	I-02	Curb	Sag	PCO 15'	2.08	8.64			18.50	7.16	0.37	0.14
	I-03	Curb	On Grade	PCO 10'	3.82	3.01	I-02	0.81	18.50	11.43	0.37	0.23
	I-04	Curb	On Grade	PCO 10'	2.24	2.23	I-05	0.01	18.50	11.00	0.37	0.22
	I-05	Curb	Sag	PCO 15'	2.15	8.64			18.50	7.33	0.37	0.15
	I-06	Curb	On Grade	PCO 10'	3.96	3.08	I-05	0.88	18.50	11.59	0.37	0.23
K	K-01	Curb	On Grade	PCO 10'	0.85	0.85	K-02		6.50	6.21	0.13	0.12
	K-02	Curb	Sag	PCO 15'	1.13	1.80			6.50	4.75	0.13	0.10
	K-03	Curb	On Grade	PCO 10'	0.58	0.58	K-02		6.50	6.37	0.13	0.13
	K-10	Curb	On Grade	PCO 10'	0.64	0.64	K-11		6.50	5.58	0.13	0.11
	K-11	Curb	Sag	PCO 15'	0.51	1.80			6.50	2.79	0.13	0.06
	K-12	Curb	On Grade	PCO 10'	0.36	0.36	K-11		6.50	5.36	0.13	0.11
L	L-02	Curb	On Grade	PCO 10'	0.74	0.74	L-03		6.50	6.35	0.13	0.13
	L-03	Curb	Sag	PCO 15'	0.71	1.80			6.50	3.49	0.13	0.07
	L-04	Curb	On Grade	PCO 10'	0.61	0.61	L-03		6.50	6.20	0.13	0.12
	L-05	Curb	On Grade	PCO 10'	0.71	0.71	L-06		6.50	6.25	0.13	0.13
	L-06	Curb	Sag	PCO 15'	0.67	1.80			6.50	3.38	0.13	0.07
	L-07	Curb	On Grade	PCO 10'	0.69	0.69	L-06		6.50	6.48	0.13	0.13

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HILLSIDE TERRACE

PROPOSED STORM SEWER HYDRAULIC DATA

DESIGNED BY:		SHEET 2 OF 4
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APPROVED BY:		

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5-YR Proposed Storm Sewer Link Computations											
Network	Link ID	Node ID US	Node ID DS	FL EL US (ft)	FL EL DS (ft)	Size	Length (ft)	Slope (%)	Link Velocity (fps)	Link Discharge (cfs)	Link Capactiy (cfs)
A	A-LAT10	A-14	A-05	711.10	710.60	18" RCP	47.75	0.97	4.07	1.14	12.03
	A-LAT13	A-15	A-06	721.00	720.50	18" RCP	47.75	0.99	3.86	0.93	12.15
	A-LAT16	A-16	A-07	731.30	730.80	18" RCP	47.75	0.99	3.87	0.95	12.15
	A-LAT20	A-18	A-09	746.20	745.80	18" RCP	50.00	0.75	3.19	0.67	10.63
	A-MAIN15	A-JUN06	A-08	744.50	741.30	18" RCP	255.50	1.23	4.64	1.32	13.58
	A-MAIN16	A-09	A-JUN06	745.80	744.50	18" RCP	270.81	0.47	3.28	1.32	8.41
D	D-LAT01	D-03	D-01	737.78	737.50	18" RCP	50.00	0.53	3.32	1.17	8.90
	D-LAT02	D-04	D-02	732.30	731.90	18" RCP	50.00	0.75	3.16	0.64	10.63
	D-MAIN01	D-01	D-02	737.10	731.50	18" RCP	195.00	2.80	7.31	2.34	20.48
	D-MAIN02	D-02	D-OUT	731.33	731.14	18" RCP	34.63	0.50	4.40	3.55	8.66
E	E-LAT03	E-04	E-09	731.80	731.40	18" RCP	50.00	0.75	3.27	0.73	10.63
	E-LAT04	E-05	E-10	737.30	737.00	18" RCP	50.00	0.57	3.06	0.83	9.21
	E-LAT05	E-12	E-11	742.10	741.40	18" RCP	42.00	1.56	3.14	0.27	15.27
	E-MAIN04	E-09	E-08	731.40	730.30	18" RCP	95.00	1.10	5.95	3.68	12.84
	E-MAIN05	E-10	E-09	737.00	731.40	18" RCP	220.00	2.49	7.02	2.33	19.31
	E-MAIN06	E-JUN01	E-10	740.90	737.00	18" RCP	95.50	3.90	5.59	0.64	24.17
	E-MAIN07	E-11	E-JUN01	741.40	740.90	18" RCP	38.27	1.17	3.66	0.64	13.24
F	F-LAT01	F-01	F-03	724.70	724.50	18" RCP	43.60	0.43	3.15	1.27	8.02
	F-LAT02	F-05	F-02	715.90	715.60	18" RCP	64.00	0.45	4.19	3.42	8.19
	F-MAIN01	F-03	F-04	724.00	717.60	18" RCP	194.16	3.21	7.84	2.51	21.94
	F-MAIN02	F-04	F-05	717.60	715.90	18" RCP	115.00	1.42	6.19	3.07	14.57
	F-MAIN03	F-02	F-OUT	713.80	713.75	24" RCP	16.55	0.28	3.73	4.43	13.87
G	G-MAIN01	G-04	G-05	715.30	714.10	18" RCP	140.79	0.82	3.05	0.53	11.11
	G-MAIN02	G-05	G-06	714.10	713.70	18" RCP	75.44	0.50	3.07	0.98	8.63
H	H-LAT01	H-05	H-01	718.30	717.80	18" RCP	74.60	0.64	3.15	0.78	9.83
	H-LAT02	H-06	H-02	724.90	724.60	18" RCP	76.00	0.38	3.22	1.59	7.54
	H-LAT03	H-07	H-03	743.00	742.70	18" RCP	76.00	0.38	3.10	1.39	7.54
	H-LAT04	H-08	H-04	765.00	764.70	18" RCP	76.00	0.38	3.47	2.09	7.54
	H-MAIN01	H-01	H-OUT	715.30	715.00	24" RCP	76.16	0.38	5.20	10.86	16.28
	H-MAIN02	H-02	H-01	723.00	717.30	24" RCP	150.94	3.66	11.67	9.46	50.40
	H-MAIN03	H-03	H-02	737.50	724.40	24" RCP	260.00	4.94	11.82	6.78	58.61
	H-MAIN04	H-04	H-03	764.20	742.20	24" RCP	280.00	7.72	11.97	4.13	73.25
J	J-LAT01	J-09	J-01	768.80	767.70	18" RCP	76.00	1.39	6.60	3.93	14.44
	J-LAT02	J-10	J-02	760.60	760.20	18" RCP	76.00	0.51	3.34	1.27	8.71
	J-LAT03	J-11	J-03	741.50	741.10	18" RCP	76.00	0.51	3.57	1.62	8.71
	J-LAT04	J-12	J-04	718.20	717.80	18" RCP	76.00	0.51	3.52	1.53	8.71
	J-LAT05	J-13	J-05	703.10	702.70	18" RCP	76.00	0.51	3.13	1.02	8.71
	J-LAT06	J-14	J-06	694.10	693.50	18" RCP	76.00	0.76	3.26	0.71	10.67
	J-LAT07	J-15	J-07	689.40	688.00	18" RCP	76.66	1.76	4.50	0.78	16.23
	J-MAIN01	J-08	J-09	775.10	768.80	18" RCP	155.00	3.94	8.81	2.93	24.29
	J-MAIN02	J-01	J-02	767.70	760.20	18" RCP	190.00	3.85	11.12	6.86	24.01
	J-MAIN03	J-02	J-JUN01	757.20	752.40	18" RCP	120.50	3.84	11.93	8.95	23.99
	J-MAIN04	J-JUN01	J-03	745.70	740.60	24" RCP	120.50	4.08	11.96	8.95	53.25
	J-MAIN05	J-03	J-JUN02	733.30	729.40	24" RCP	115.50	3.25	11.92	11.90	47.53
	J-MAIN06	J-JUN02	J-04	721.20	717.30	24" RCP	115.50	3.25	11.92	11.90	47.53
	J-MAIN07	J-04	J-JUN03	711.80	709.40	24" RCP	80.50	2.82	11.96	14.49	44.30
	J-MAIN08	J-JUN03	J-05	704.16	702.20	24" RCP	65.50	2.80	11.92	14.49	44.11
	J-MAIN09	J-05	J-06	695.80	693.00	24" RCP	105.00	2.55	11.86	16.22	42.06
	J-MAIN10	J-06	J-07	690.50	687.50	24" RCP	117.00	2.46	11.94	17.42	41.34
	J-MAIN11	J-07	J-OUT	687.19	687.00	24" RCP	17.00	1.00	8.61	18.70	26.36
K	K-LAT04	K-13	K-04	741.80	741.50	18" RCP	51.13	0.55	3.18	0.98	9.11
	K-LAT05	K-14	K-07	746.20	745.90	18" RCP	45.28	0.62	3.46	1.09	9.65
	K-MAIN04	K-04	K-03	741.50	741.20	18" RCP	45.00	0.60	5.65	7.85	9.48
	K-MAIN05	K-05	K-04	742.90	741.50	18" RCP	89.58	1.48	7.58	6.08	14.89
	K-MAIN06	K-06	K-05	744.60	742.90	18" RCP	115.00	1.42	7.12	5.10	14.57
	K-MAIN07	K-07	K-06	745.90	744.60	18" RCP	110.00	1.13	6.15	4.08	12.91
	K-MAIN08	K-08	K-07	747.90	745.90	18" RCP	115.00	1.67	5.78	2.00	15.67
	K-MAIN09	K-09	K-08	749.60	747.90	18" RCP	120.00	1.36	4.31	0.93	14.16
L	L-MAIN01	L-01	L-02	749.90	749.50	18" RCP	60.00	0.62	3.10	0.78	9.60

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HILLSIDE TERRACE

PROPOSED STORM SEWER HYDRAULIC DATA

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25-YR Proposed Storm Sewer Link Computations

Network	Link ID	Node ID US	Node ID DS	FL EL US (ft)	FL EL DS (ft)	Size	Length (ft)	Slope (%)	Link Velocity (fps)	Link Discharge (cfs)	Link Capactiy (cfs)
A	A-LAT01	A-10	A-JUN07	705.00	704.73	24" RCP	21.43	1.00	8.31	16.15	26.36
	A-LAT02	A-JUN08	A-10	705.60	705.00	24" RCP	69.75	0.81	7.61	15.56	23.70
	A-LAT03	A-20	A-JUN08	706.81	706.10	18" RCP	11.29	5.34	11.16	4.57	28.29
	A-LAT04	A-19	A-JUN08	706.10	705.60	24" RCP	14.45	3.04	11.40	11.00	45.96
	A-LAT05	A-11	A-02	706.90	706.40	18" RCP	49.81	0.92	3.44	0.68	11.75
	A-LAT06	A-12	A-03	706.60	706.10	18" RCP	48.46	0.94	3.40	0.64	11.89
	A-LAT07	A-13	A-04	707.00	706.50	18" RCP	47.75	0.96	3.64	0.78	11.97
	A-LAT08	A-21	A-JUN02	708.90	708.40	24" RCP	57.50	0.80	7.58	15.60	23.58
	A-LAT09	A-22	A-21	710.50	709.40	18" RCP	44.50	2.29	10.99	14.98	18.53
	A-LAT11	A-23	A-JUN03	716.40	715.90	24" RCP	56.50	0.83	7.68	15.59	23.97
	A-LAT12	A-24	A-23	718.20	716.90	18" RCP	45.54	2.65	11.64	14.77	19.93
	A-LAT14	A-25	A-JUN04	725.20	724.80	24" RCP	59.00	0.64	7.03	17.18	21.09
	A-LAT15	A-26	A-25	727.00	725.70	18" RCP	44.50	2.71	11.79	15.13	20.15
	A-LAT17	A-27	A-JUN05	735.70	735.20	18" RCP	63.00	0.75	4.81	2.82	10.61
	A-LAT18	A-17	A-08	739.00	738.50	18" RCP	47.75	0.99	6.86	7.62	12.15
	A-LAT19	A-28	A-17	739.50	739.00	18" RCP	38.53	1.15	6.92	6.18	13.12
	A-MAIN01	A-JUN07	A-OUT	700.16	699.87	4'X4' SBC	53.71	0.50	9.13	84.71	167.65
	A-MAIN02	A-JUN01	A-JUN07	701.50	701.00	4'X4' SBC	73.75	0.62	9.54	70.84	186.56
	A-MAIN03	A-01	A-JUN01	701.60	701.50	4'X4' SBC	9.08	0.66	9.70	70.84	193.08
	A-MAIN04	A-02	A-01	702.50	702.00	4'X4' SBC	101.51	0.47	8.57	68.97	162.45
	A-MAIN05	A-03	A-02	703.30	703.00	4'X4' SBC	38.80	0.68	9.81	68.00	196.22
	A-MAIN06	A-04	A-03	704.00	703.50	4'X4' SBC	64.46	0.72	9.95	67.10	201.16
	A-MAIN07	A-JUN02	A-04	706.50	705.50	4'X3' SBC	86.01	1.09	11.46	65.96	172.72
	A-MAIN08	A-05	A-JUN02	708.25	707.40	3'X3' SBC	67.01	1.16	11.13	51.32	118.79
	A-MAIN09	A-JUN03	A-05	711.70	709.10	36" RCP	206.00	1.23	11.93	48.70	86.28
	A-MAIN10	A-06	A-JUN03	719.80	717.30	24" RCP	139.00	1.74	11.67	33.93	34.74
	A-MAIN11	A-JUN04	A-06	722.70	720.00	24" RCP	145.50	1.80	11.90	31.63	35.37
	A-MAIN12	A-07	A-JUN04	730.80	727.00	18" RCP	135.50	2.71	11.86	15.50	20.17
	A-MAIN13	A-JUN05	A-07	735.20	730.80	18" RCP	150.50	2.84	11.66	13.01	20.62
	A-MAIN14	A-08	A-JUN05	738.50	735.20	18" RCP	135.50	2.36	10.31	10.31	18.79
E	E-LAT01	E-06	E-01	728.20	728.00	24" RCP	50.00	0.38	4.81	7.53	16.19
	E-LAT02	E-03	E-08	730.75	730.30	18" RCP	50.00	0.85	3.01	0.48	11.28
	E-MAIN01	E-01	E-OUT	727.36	727.00	24" RCP	50.34	0.70	6.26	8.71	22.06
	E-MAIN02	E-07	E-06	729.80	729.50	18" RCP	55.00	0.50	5.14	6.98	8.66
	E-MAIN03	E-08	E-07	730.05	729.80	18" RCP	60.00	0.38	4.50	6.38	7.59
	E-MAIN08	E-02	E-01	730.60	730.00	18" RCP	55.00	1.00	3.55	0.68	12.24
G	G-LAT01	G-07	G-02	713.30	713.10	18" RCP	64.80	0.29	3.71	4.00	6.65
	G-MAIN03	G-06	G-07	713.70	713.30	18" RCP	94.98	0.40	3.39	1.83	7.74
	G-MAIN04	G-08	G-07	714.50	713.90	18" RCP	95.01	0.60	3.48	1.18	9.48
	G-MAIN05	G-01	G-02	714.30	713.90	18" RCP	95.00	0.40	3.83	2.74	7.74
	G-MAIN06	G-03	G-02	714.00	713.70	18" RCP	45.00	0.60	3.84	1.69	9.48
	G-MAIN07	G-02	G-OUT	712.10	712.00	24" RCP	30.89	0.31	4.73	9.33	14.65
I	I-LAT01	I-01	I-04	779.85	779.55	18" RCP	76.00	0.38	3.52	2.24	7.54
	I-LAT02	I-02	I-05	779.60	779.15	18" RCP	76.00	0.57	3.46	1.27	9.24
	I-LAT03	I-03	I-06	779.90	779.70	18" RCP	76.00	0.25	3.44	3.82	6.16
	I-MAIN01	I-04	I-05	779.05	778.65	24" RCP	75.00	0.50	4.61	4.42	18.64
	I-MAIN02	I-05	I-06	778.65	778.45	24" RCP	65.00	0.29	4.22	6.86	14.09
	I-MAIN03	I-06	I-OUT	778.15	778.00	24" RCP	29.00	0.50	6.21	14.35	18.64
K	K-LAT01	K-01	K-10	741.60	741.30	18" RCP	42.20	0.66	3.28	0.85	9.97
	K-LAT02	K-02	K-11	741.10	740.90	18" RCP	42.85	0.44	3.08	1.13	8.08
	K-LAT03	K-03	K-12	740.70	740.40	24" RCP	43.40	0.65	6.58	12.22	21.20
	K-MAIN01	K-11	K-OUT	739.30	739.11	3'X2' SBC	20.78	0.85	7.09	15.37	61.10
	K-MAIN02	K-10	K-11	741.30	741.00	18" RCP	73.98	0.38	3.13	1.47	7.54
	K-MAIN03	K-12	K-11	740.40	740.20	24" RCP	41.02	0.43	5.68	12.49	17.38
L	L-LAT01	L-02	L-05	749.50	749.30	18" RCP	45.00	0.42	3.47	1.87	7.90
	L-LAT02	L-03	L-06	749.20	748.90	18" RCP	45.00	0.62	3.04	0.71	9.68
	L-LAT03	L-04	L-07	749.30	748.90	18" RCP	45.00	0.83	3.22	0.61	11.17
	L-MAIN02	L-05	L-06	749.30	748.90	18" RCP	70.00	0.53	4.12	2.55	8.94
	L-MAIN03	L-06	L-07	748.90	748.60	18" RCP	50.00	0.54	4.66	3.87	9.04
	L-MAIN04	L-07	L-OUT	748.60	748.50	18" RCP	19.63	0.47	4.73	5.10	8.42

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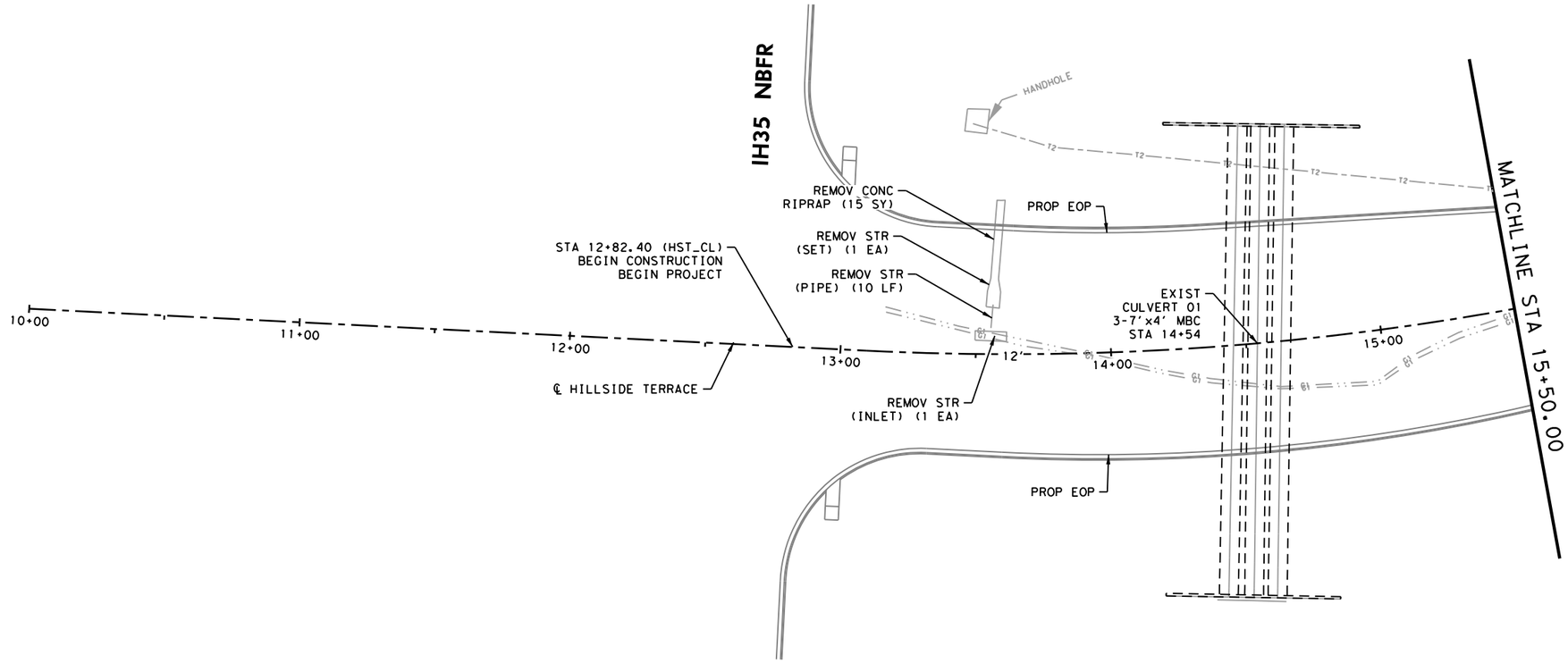
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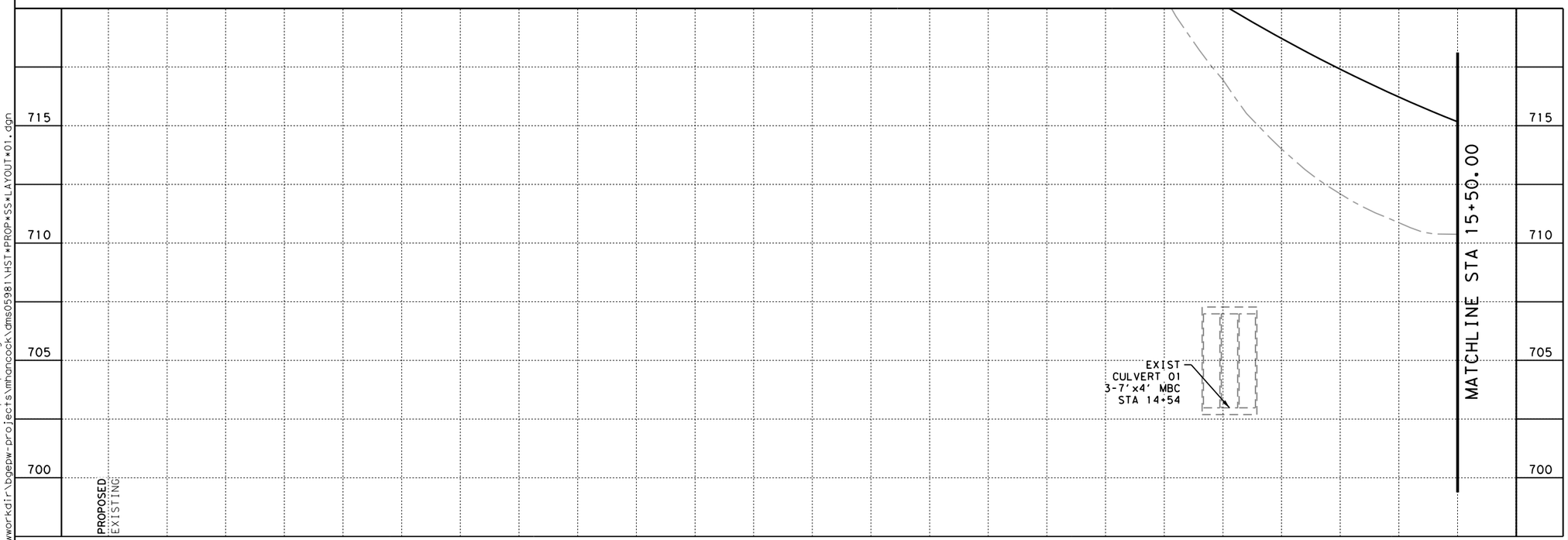
HILLSIDE TERRACE

PROPOSED STORM SEWER HYDRAULIC DATA

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CHECKED BY:		161
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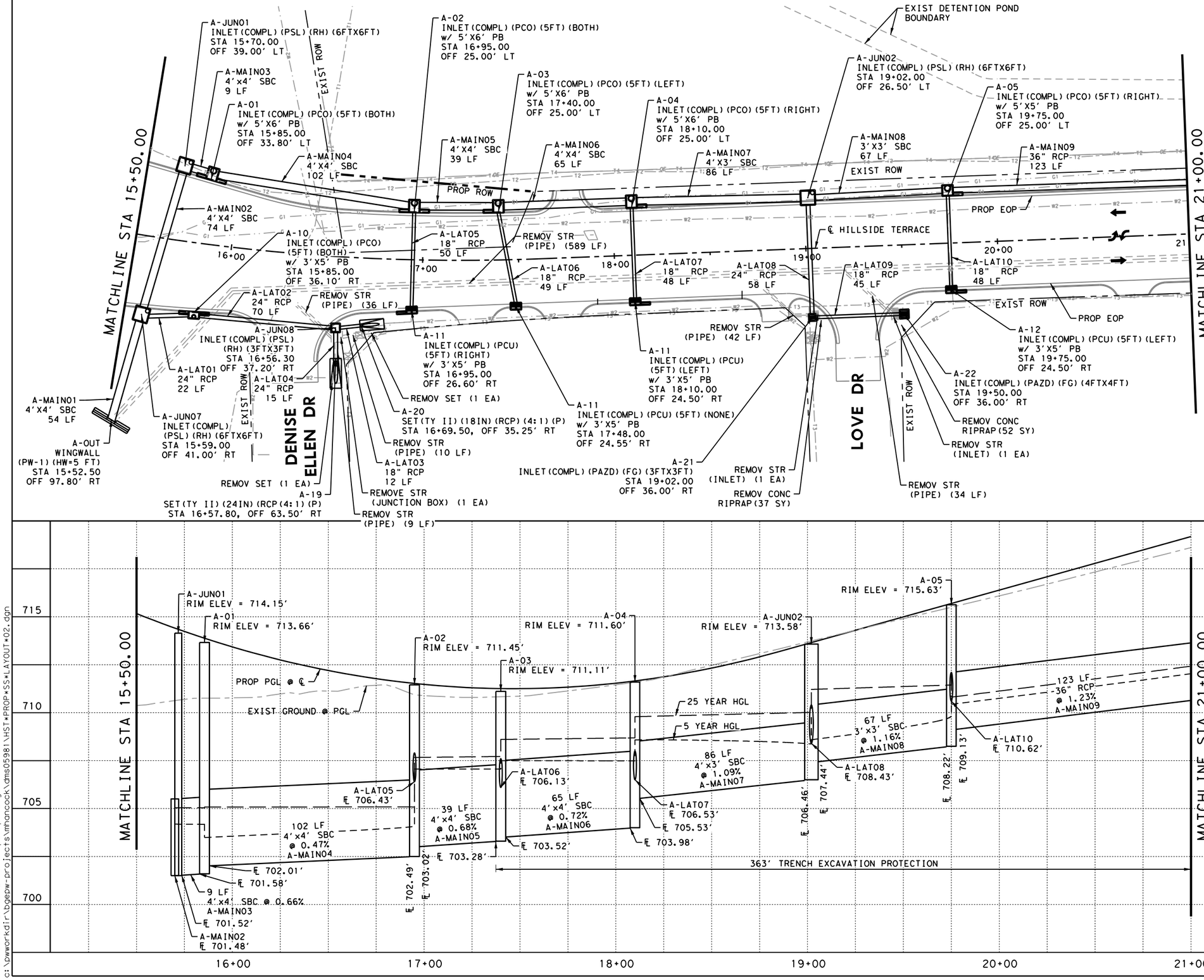
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STORM SEWER PLAN & PROFILE

(SYSTEM A)

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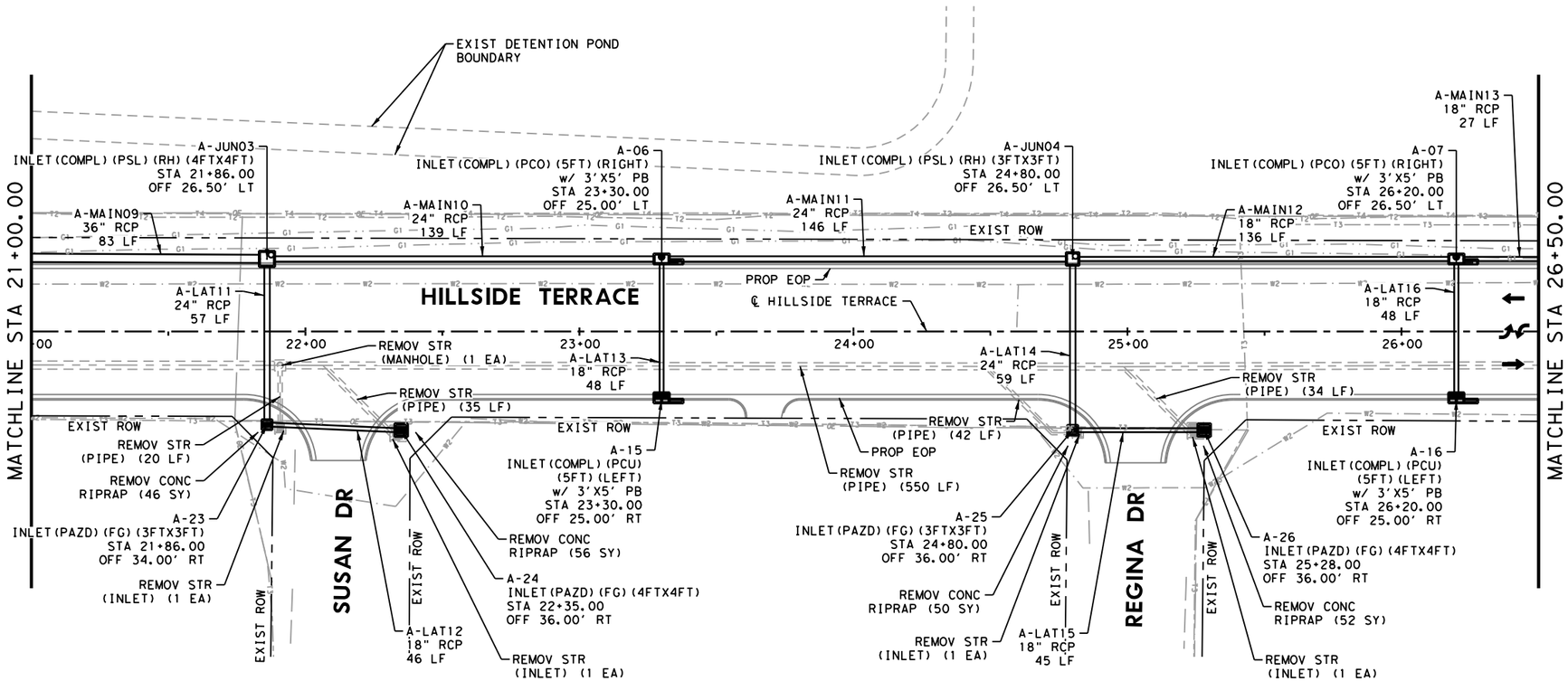
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STORM SEWER PLAN & PROFILE

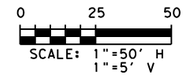
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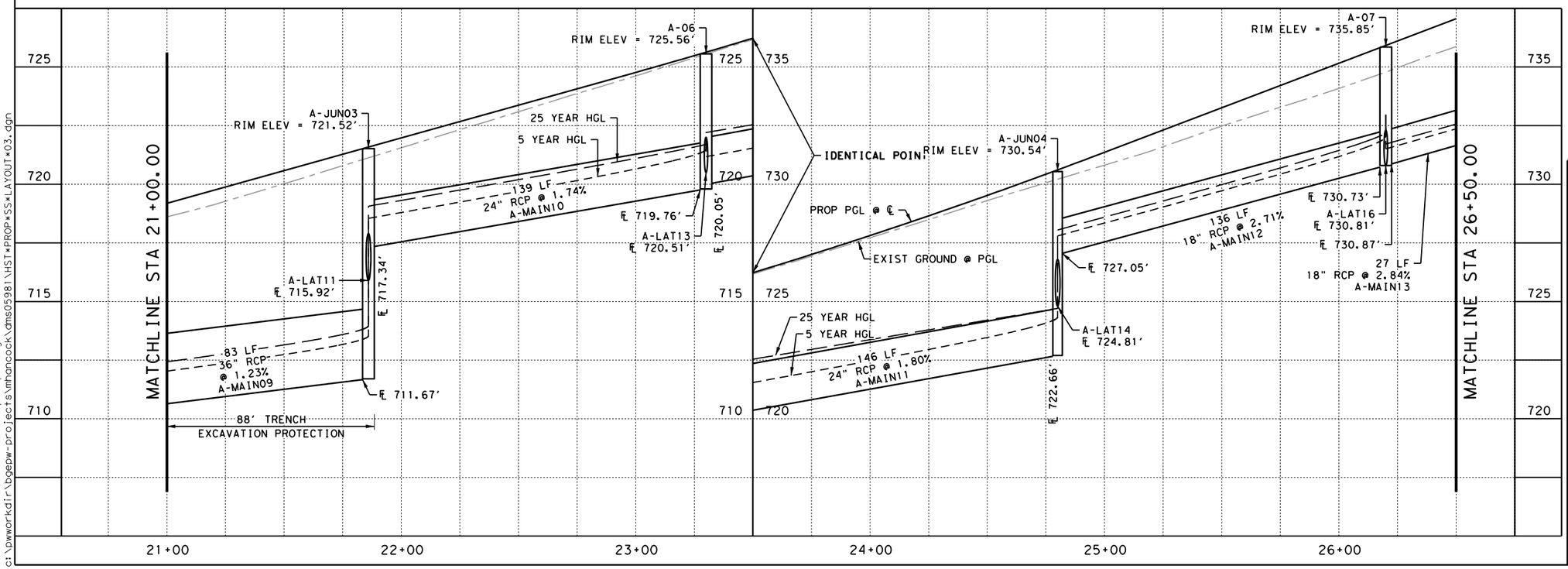
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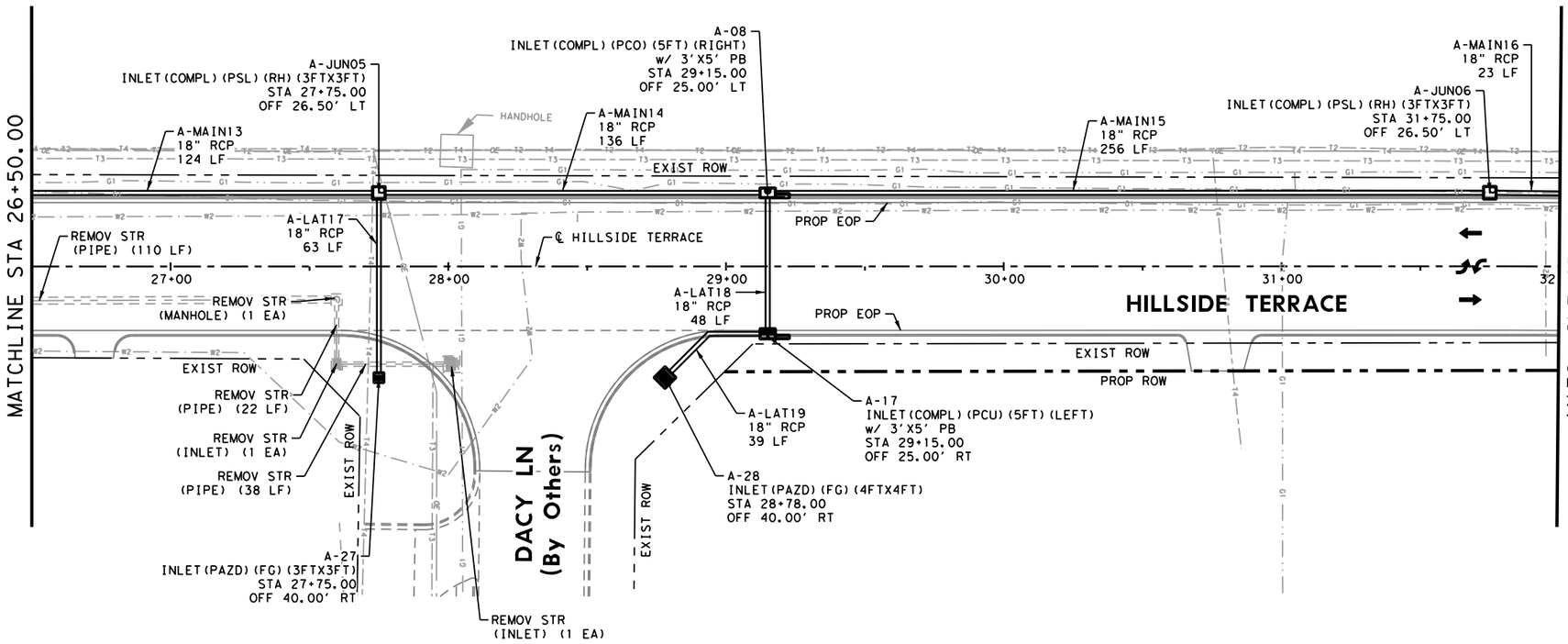
HILLSIDE TERRACE

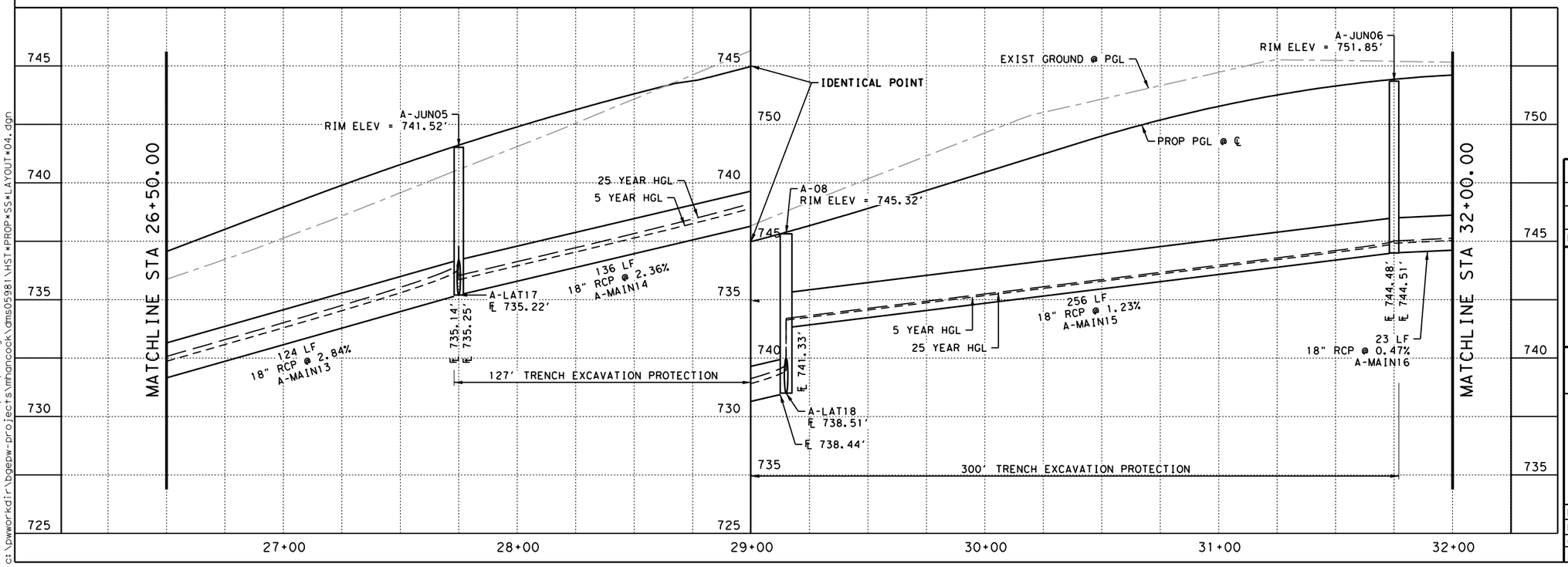
STORM SEWER PLAN & PROFILE

(SYSTEM A)

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0 25 50

SCALE: 1"=50' H
1"=5' V

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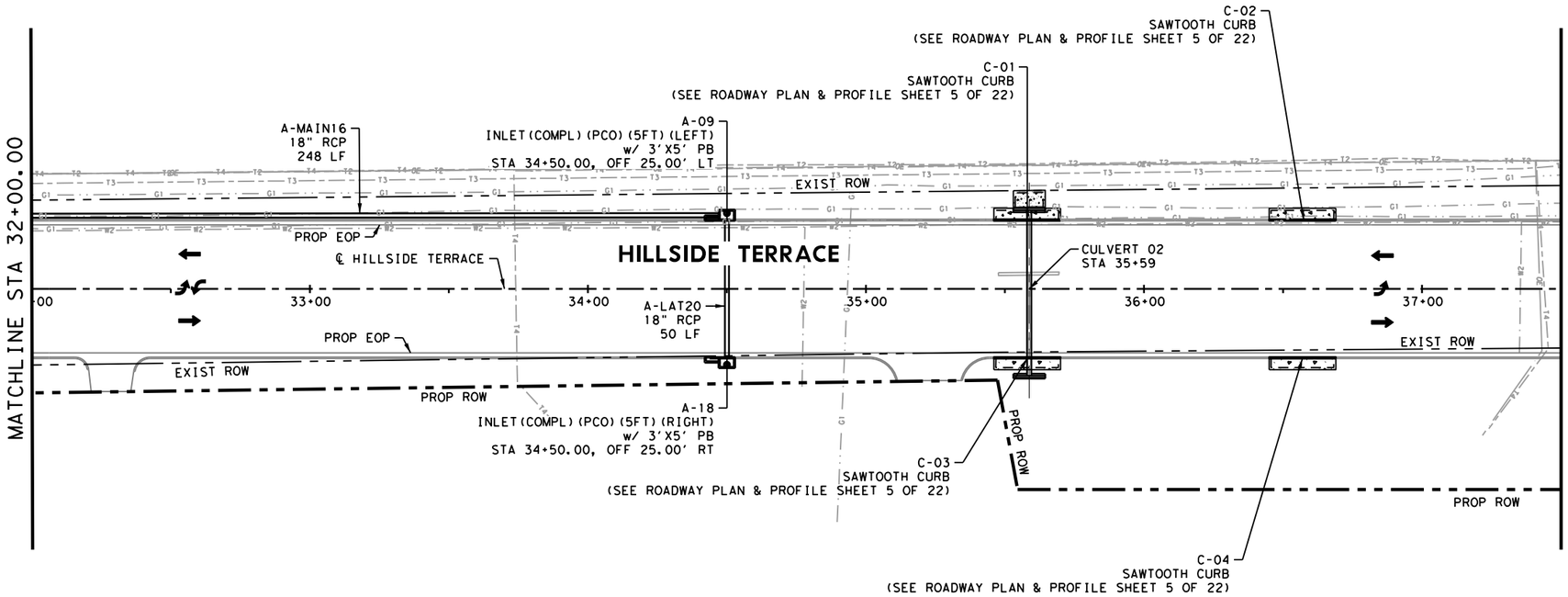
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STORM SEWER PLAN & PROFILE

(SYSTEM A)

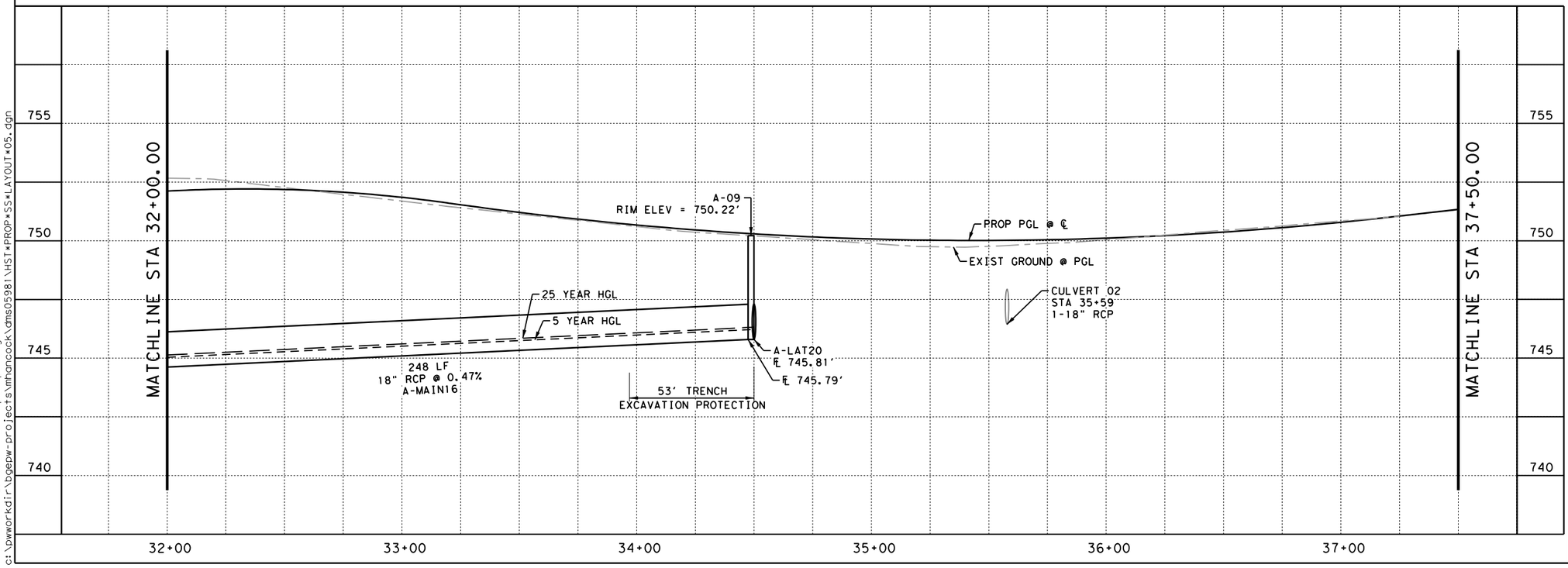
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0 25 50

SCALE: 1"=50' H
1"=5' V



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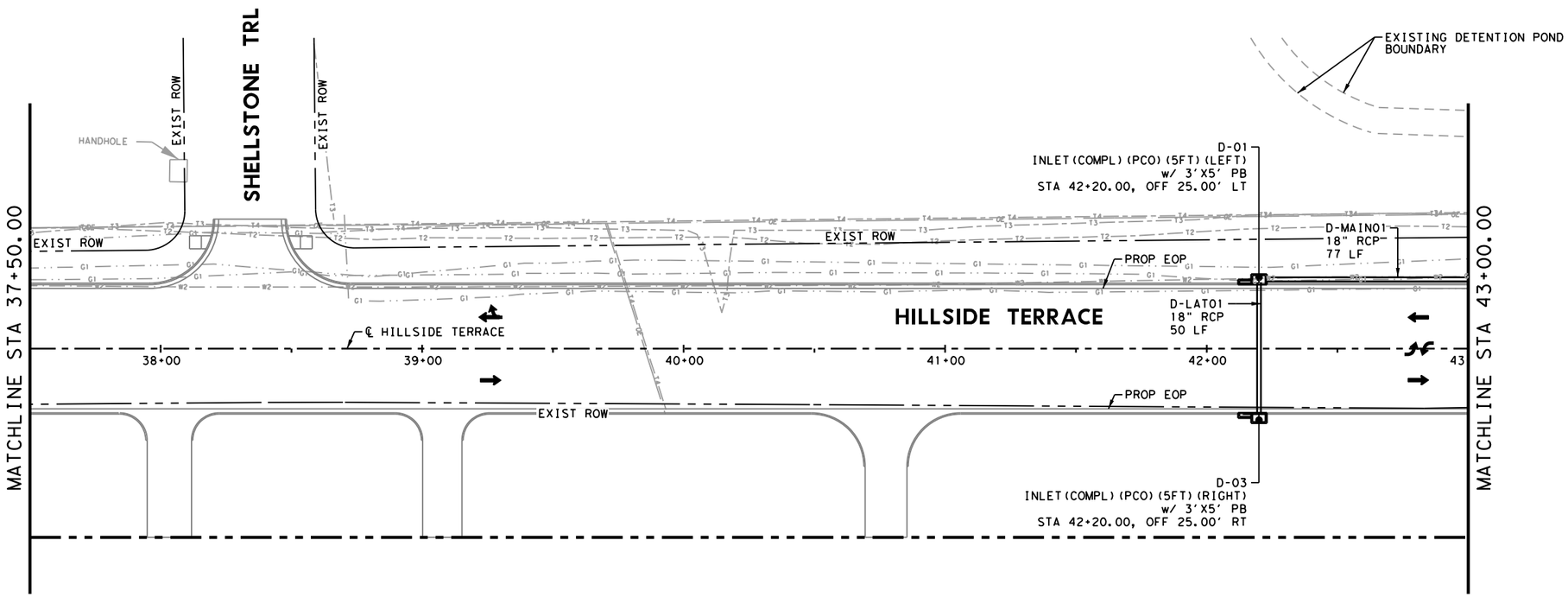
HILLSIDE TERRACE

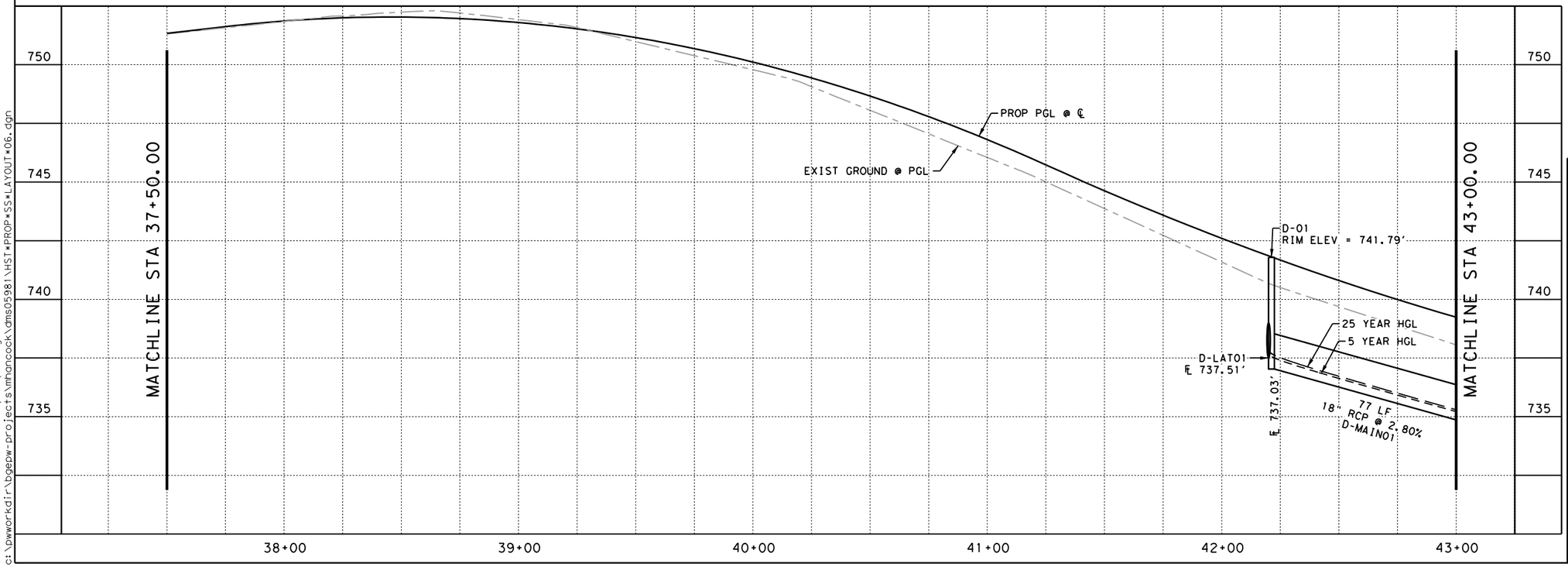
STORM SEWER PLAN & PROFILE

(SYSTEMS A & C)

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0 25 50

SCALE: 1"=50' H
1"=5' V

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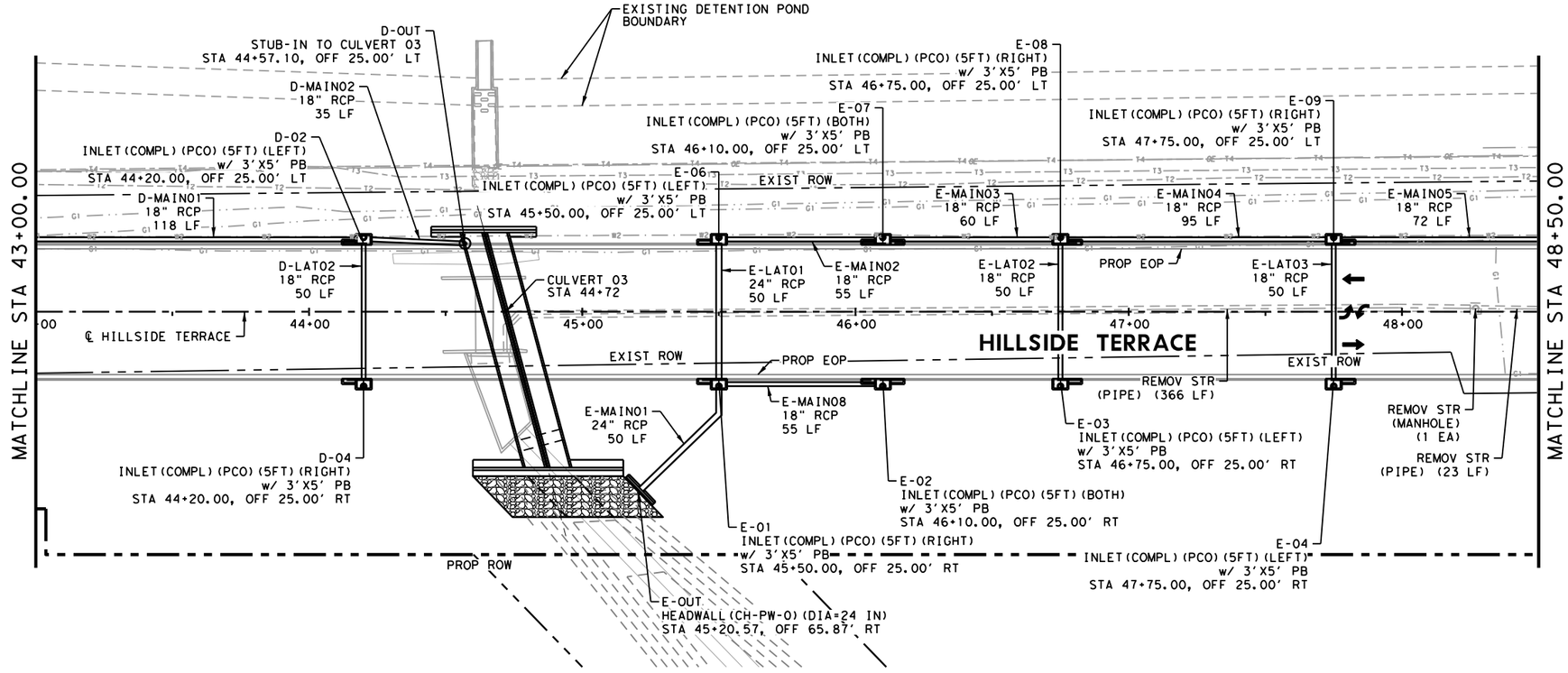
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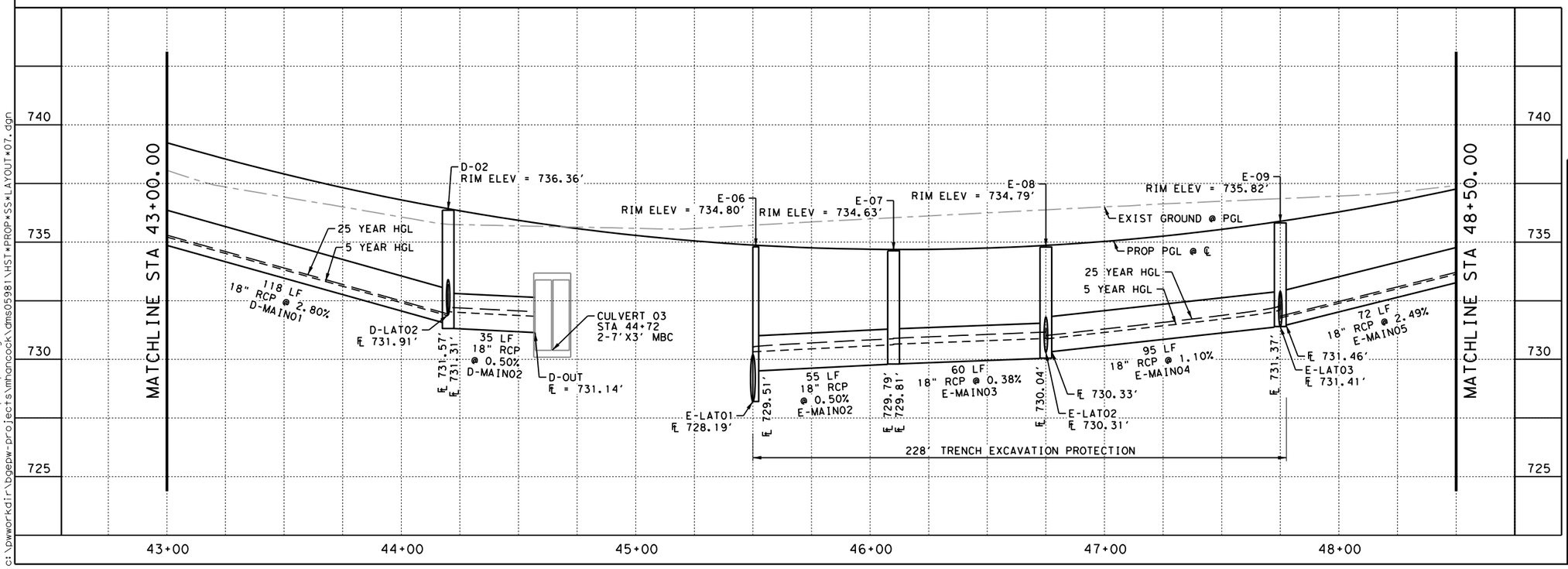
STORM SEWER PLAN & PROFILE

(SYSTEM D)

DESIGNED BY:		SHEET 6 OF 22
DRAWN BY:		167
CHECKED BY:		
APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V

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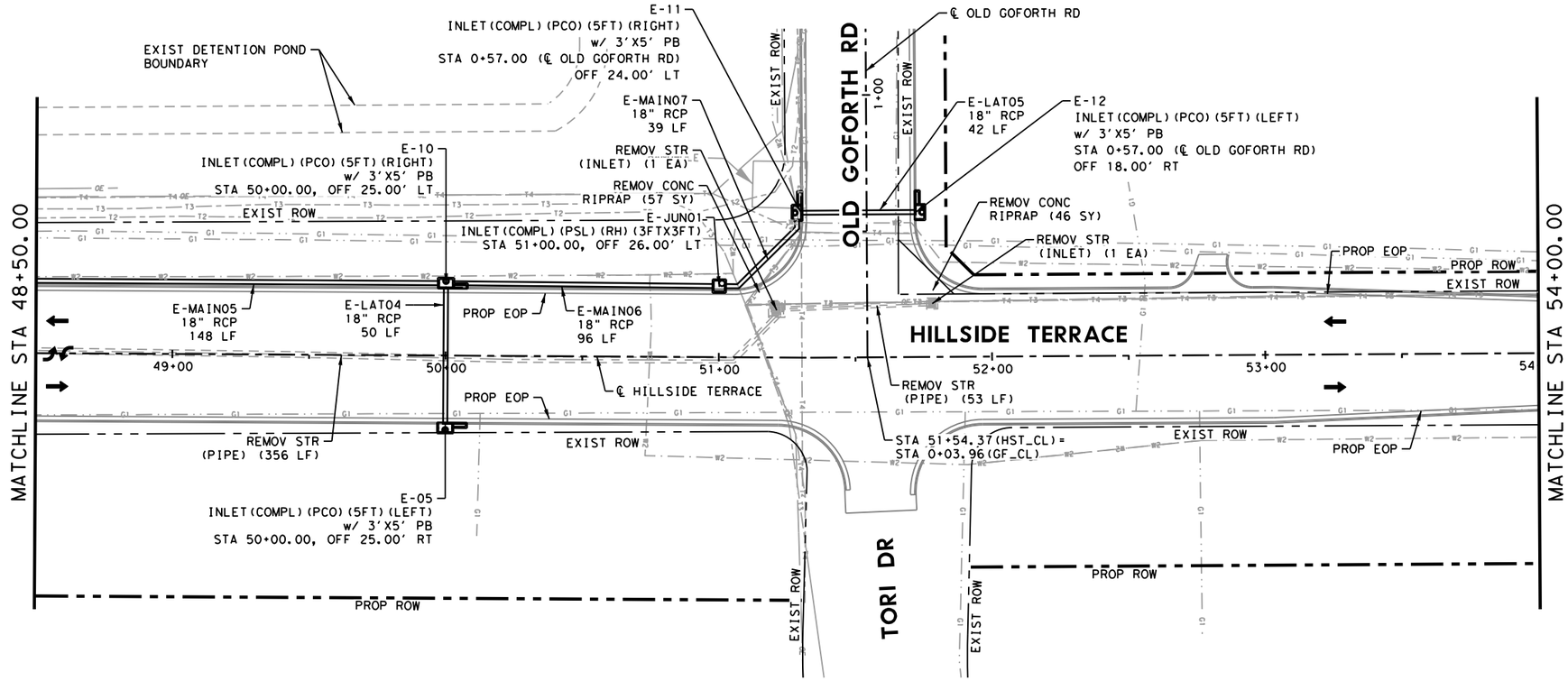
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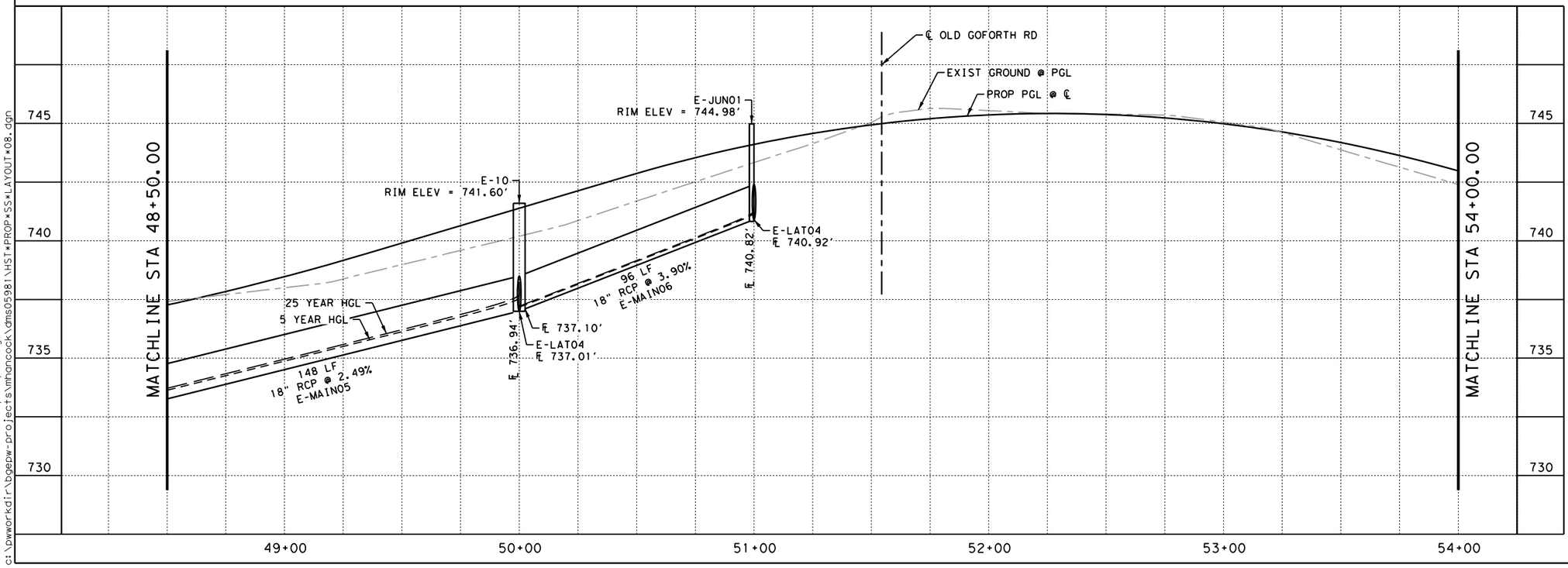
STORM SEWER PLAN & PROFILE

(SYSTEMS D & E)

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DRAWN BY:		168
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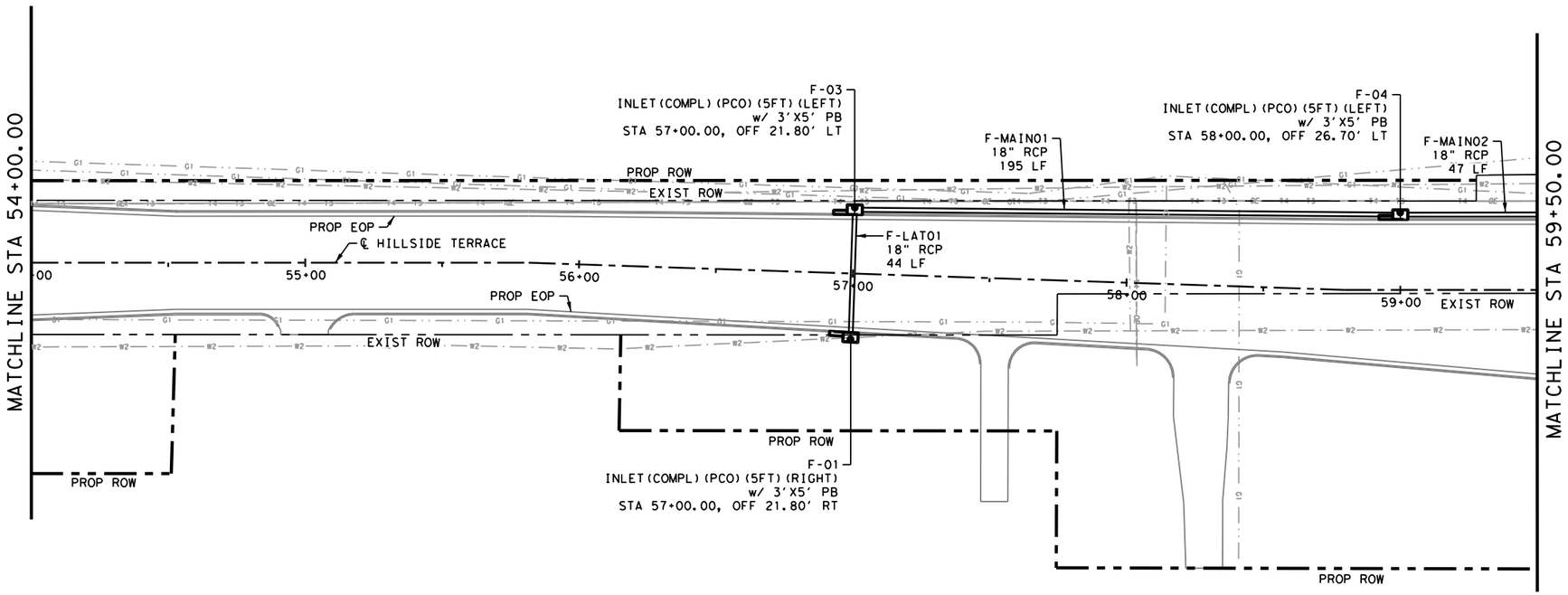
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STORM SEWER PLAN & PROFILE

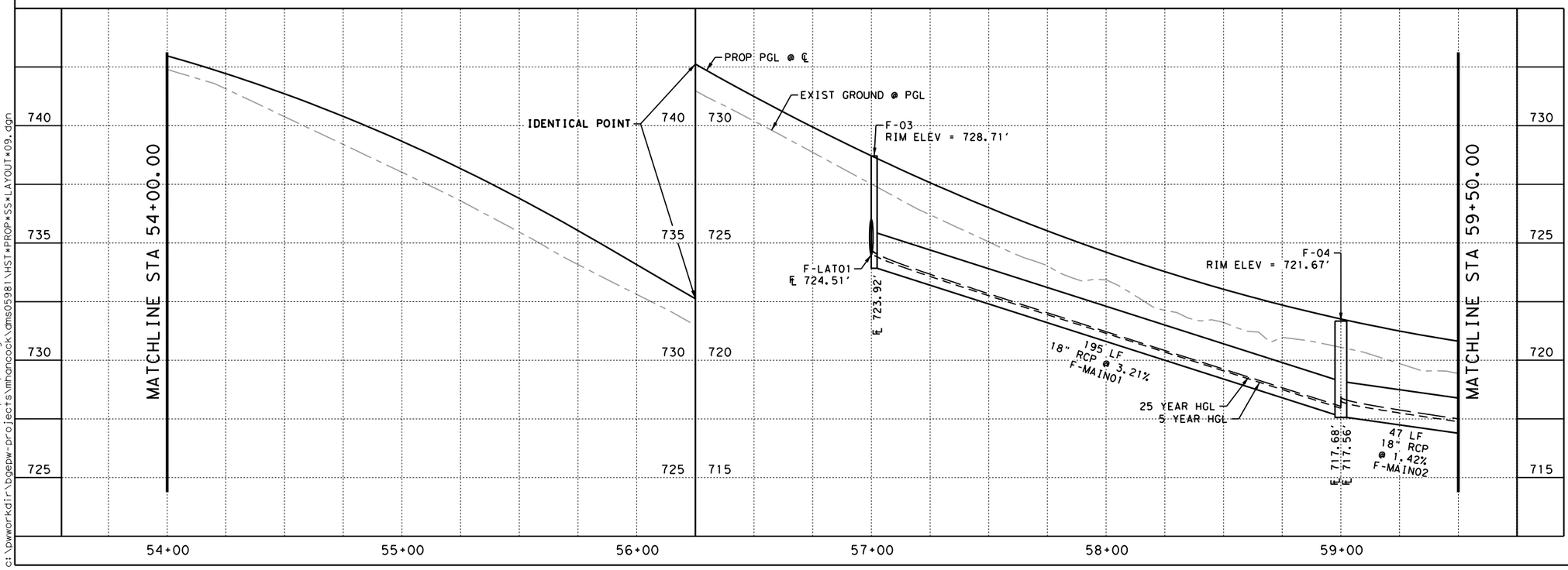
(SYSTEM E)

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APPROVED BY:		

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0 25 50
SCALE: 1"=50' H
1"=5' V



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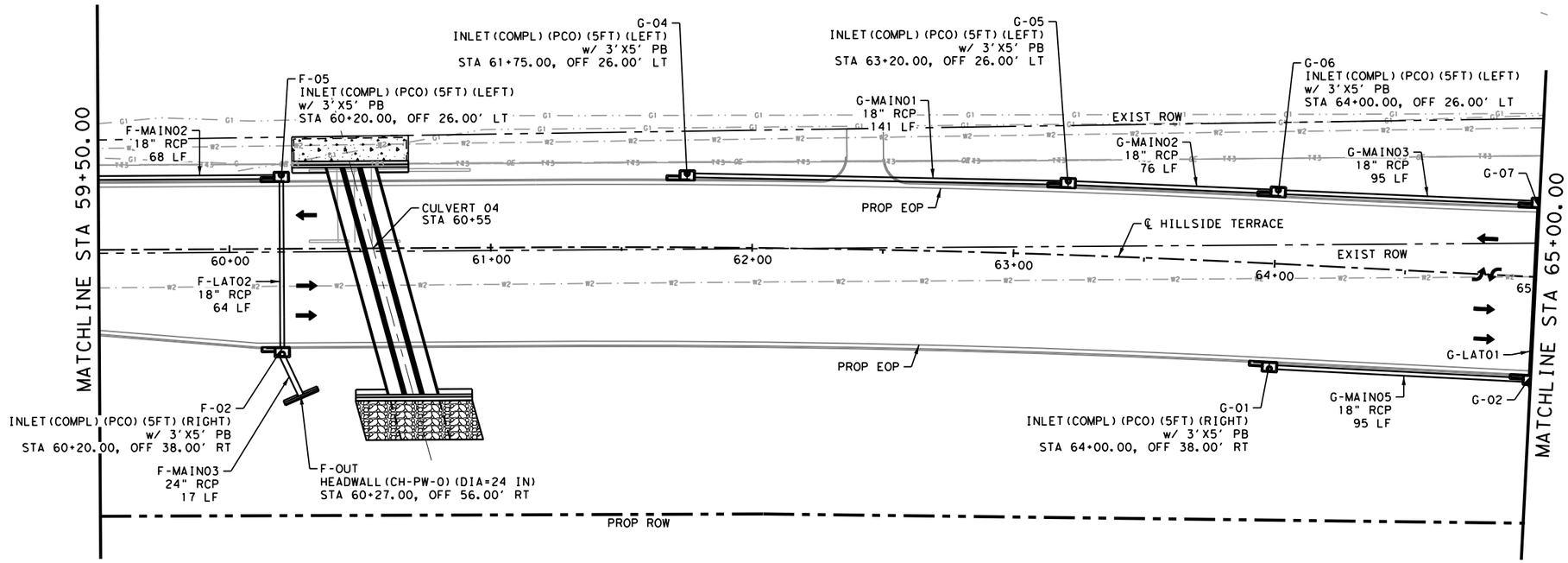
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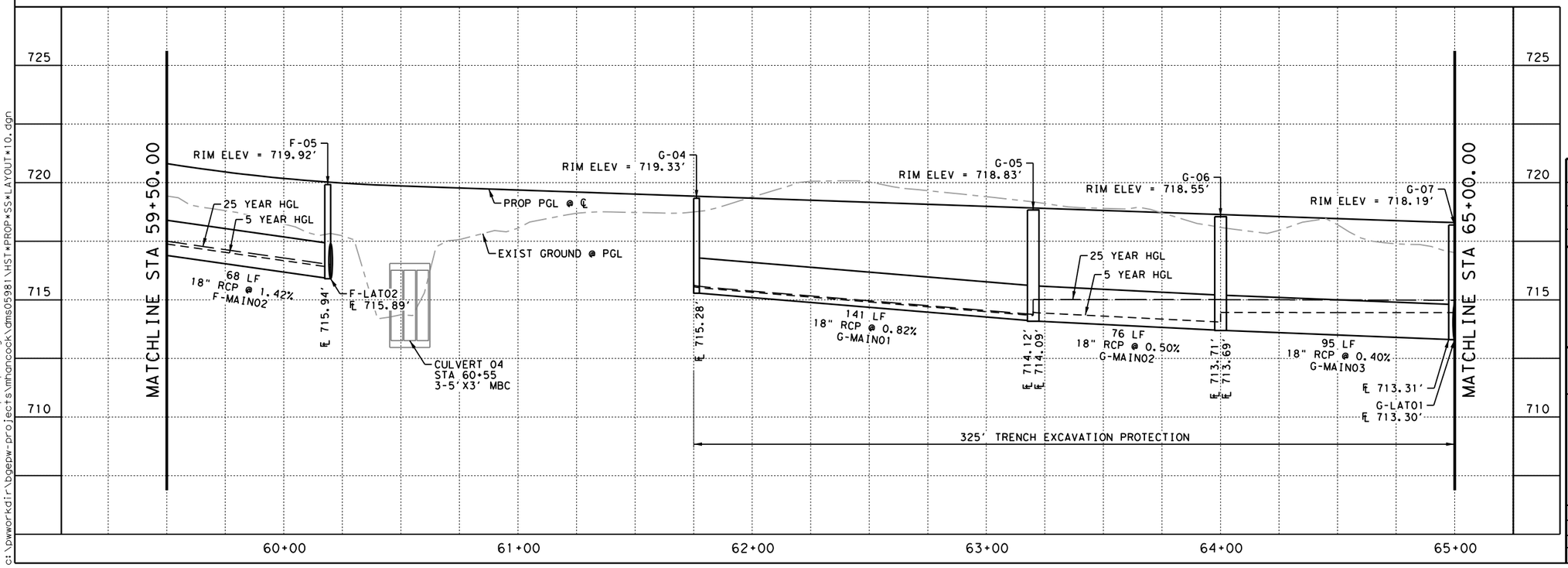
STORM SEWER PLAN & PROFILE

(SYSTEM F)

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APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V

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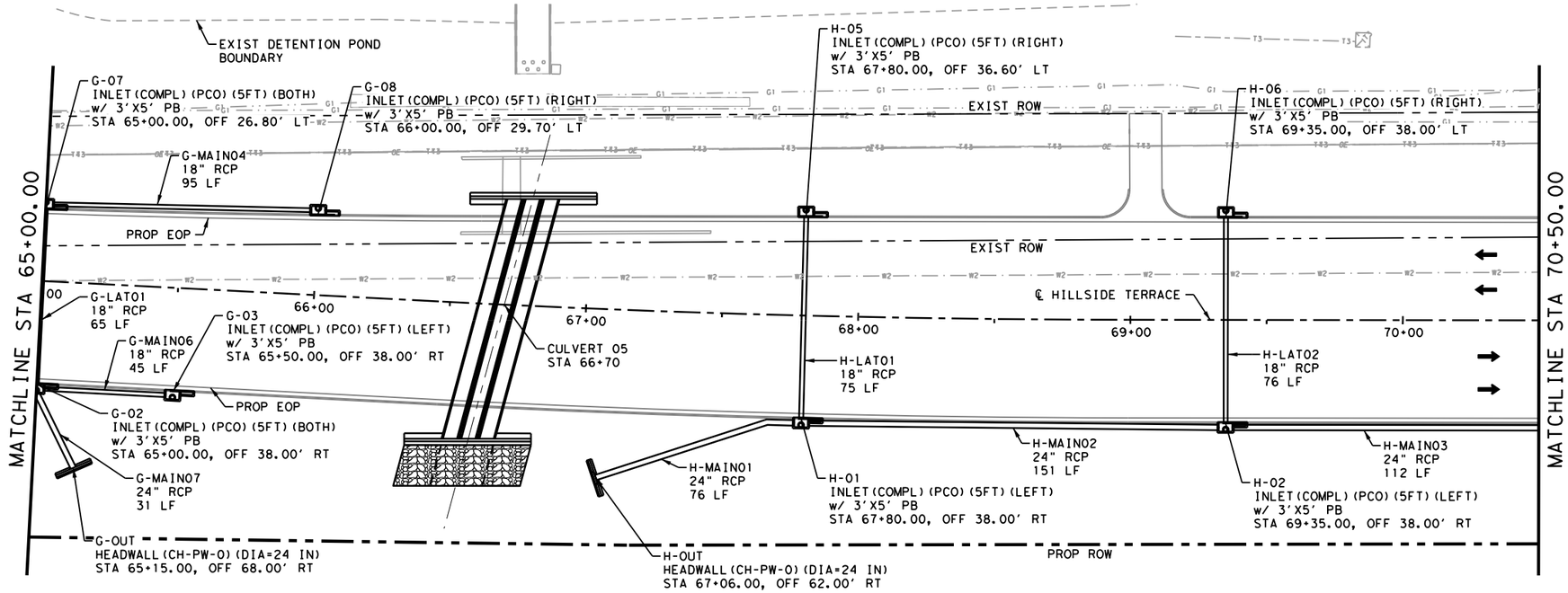
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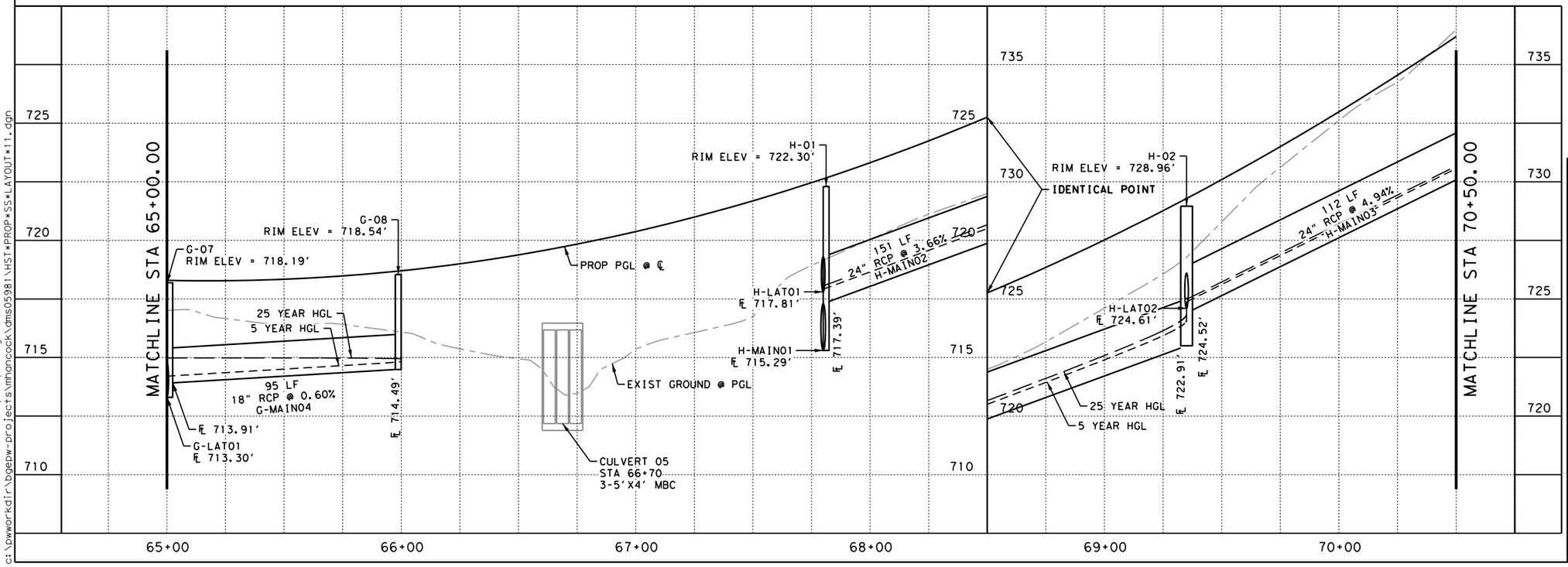
STORM SEWER PLAN & PROFILE

(SYSTEM F & G)

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0 25 50

SCALE: 1"=50' H
1"=5' V

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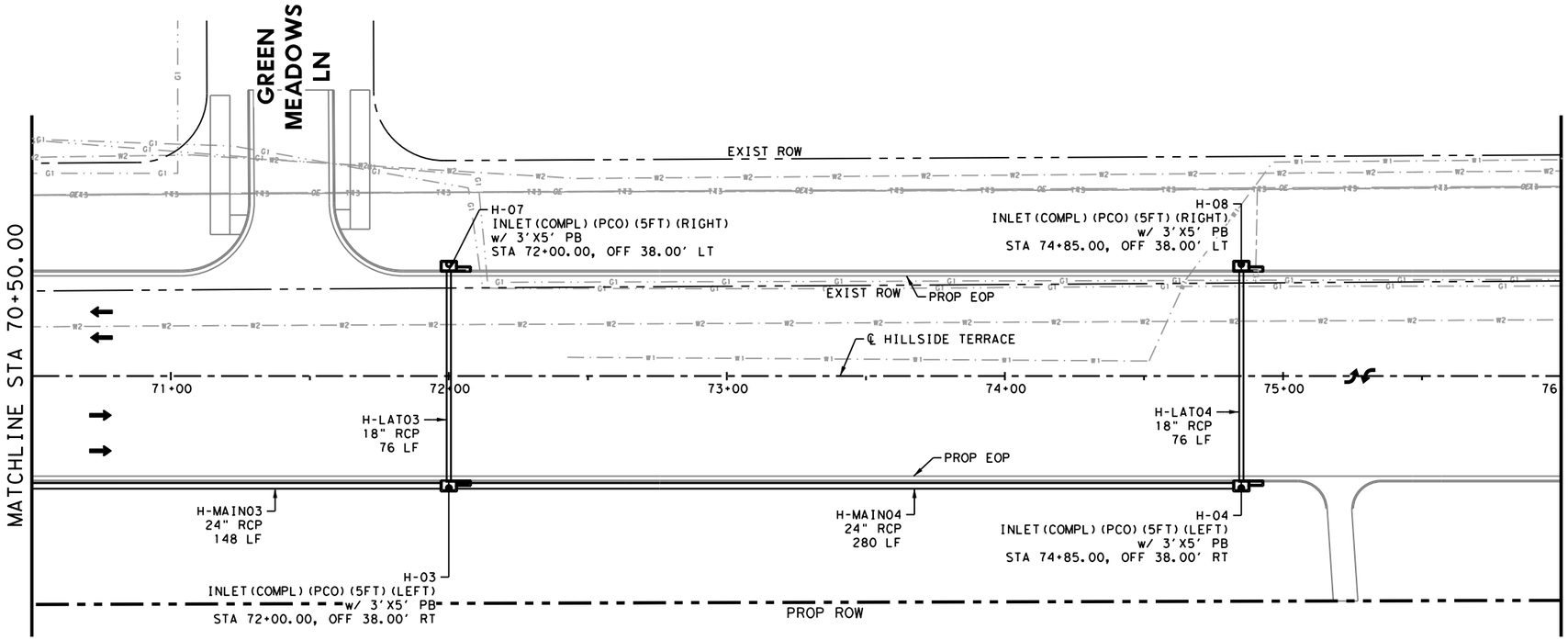
HILLSIDE TERRACE

STORM SEWER PLAN & PROFILE

(SYSTEM G & H)

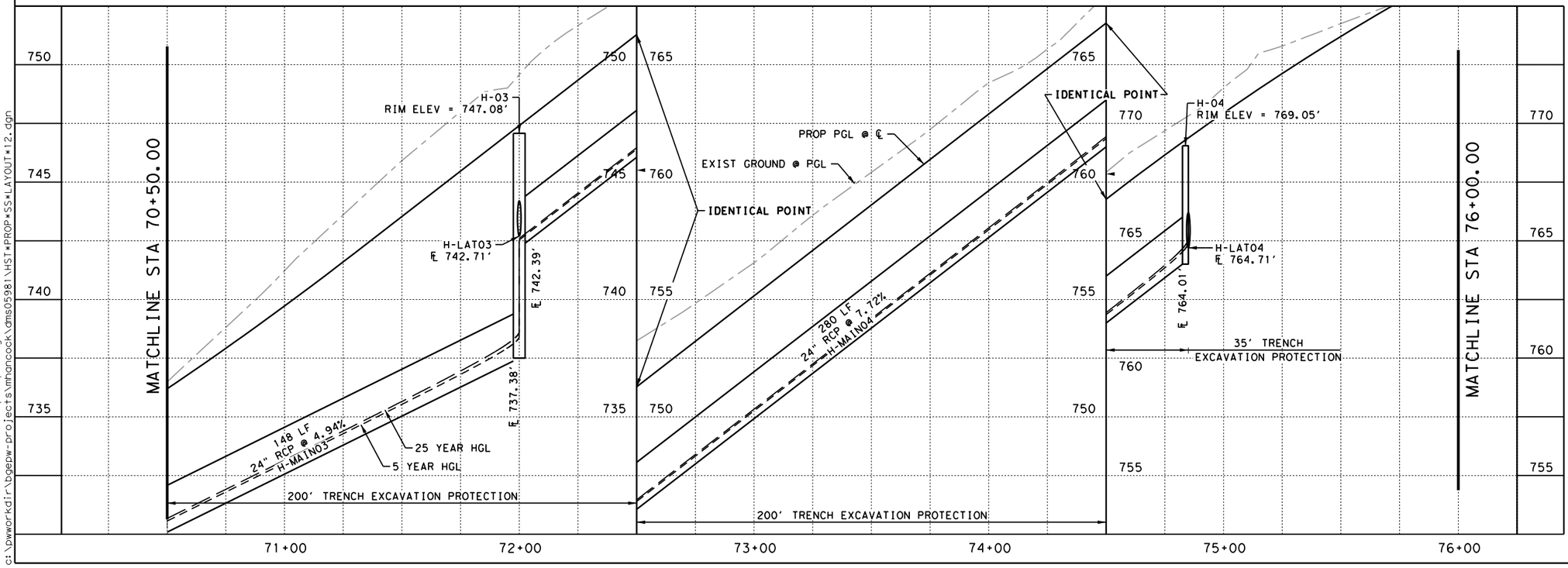
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APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V



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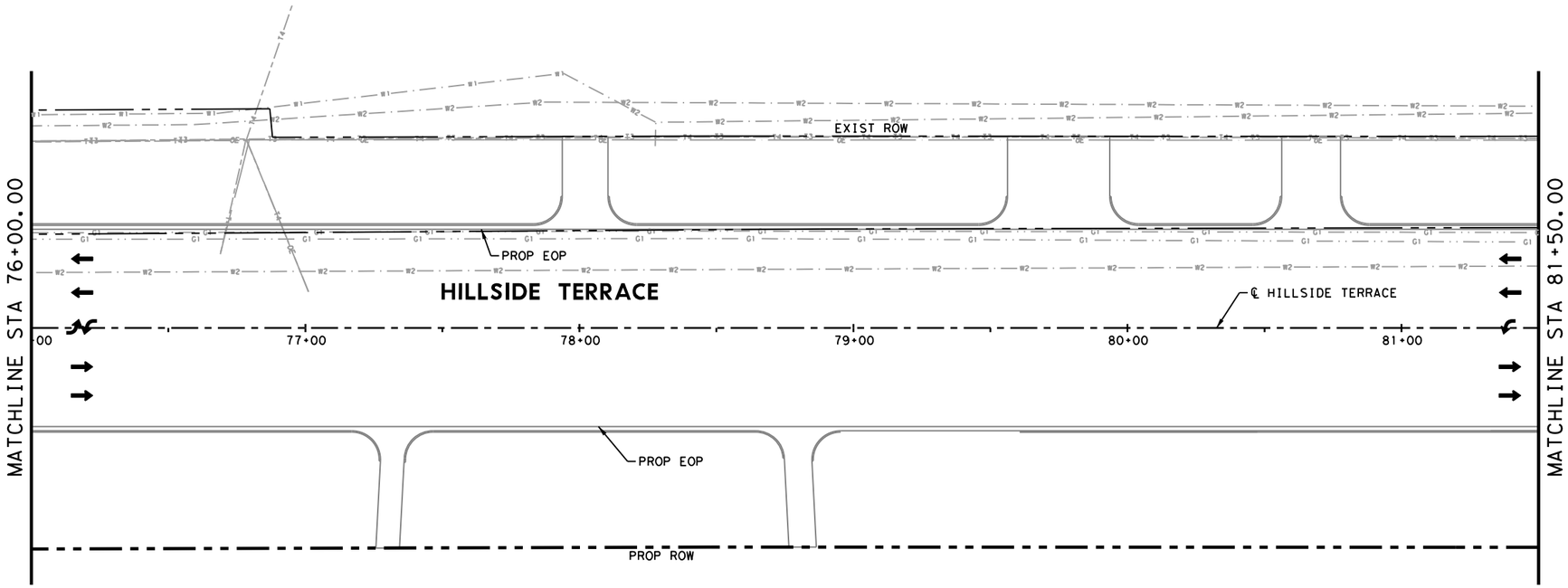
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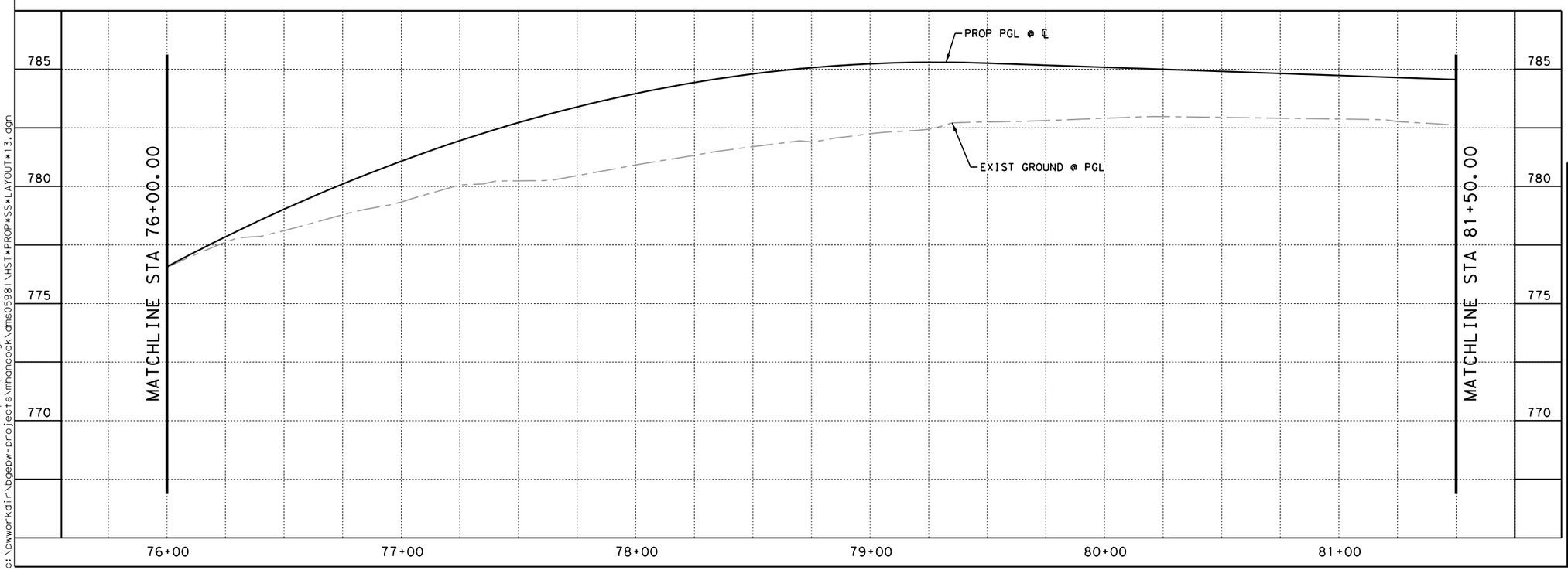
STORM SEWER PLAN & PROFILE

(SYSTEM H)

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CHECKED BY:		
APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V

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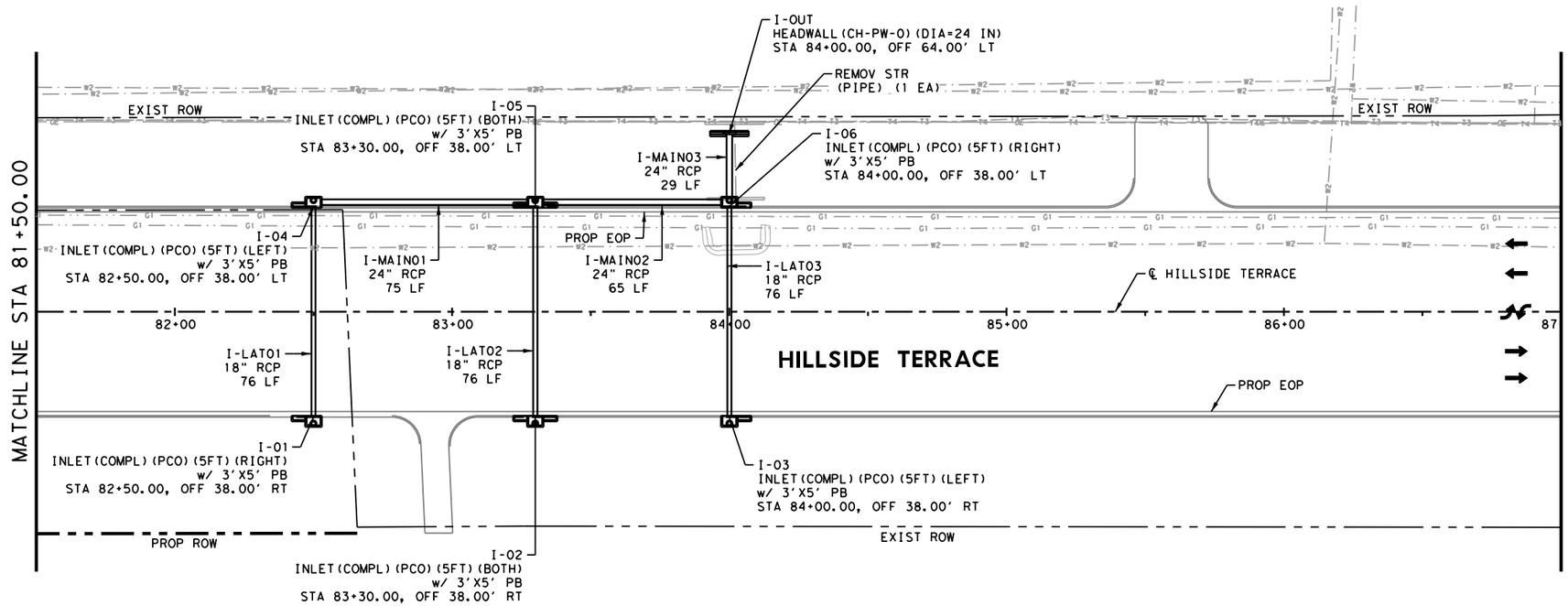
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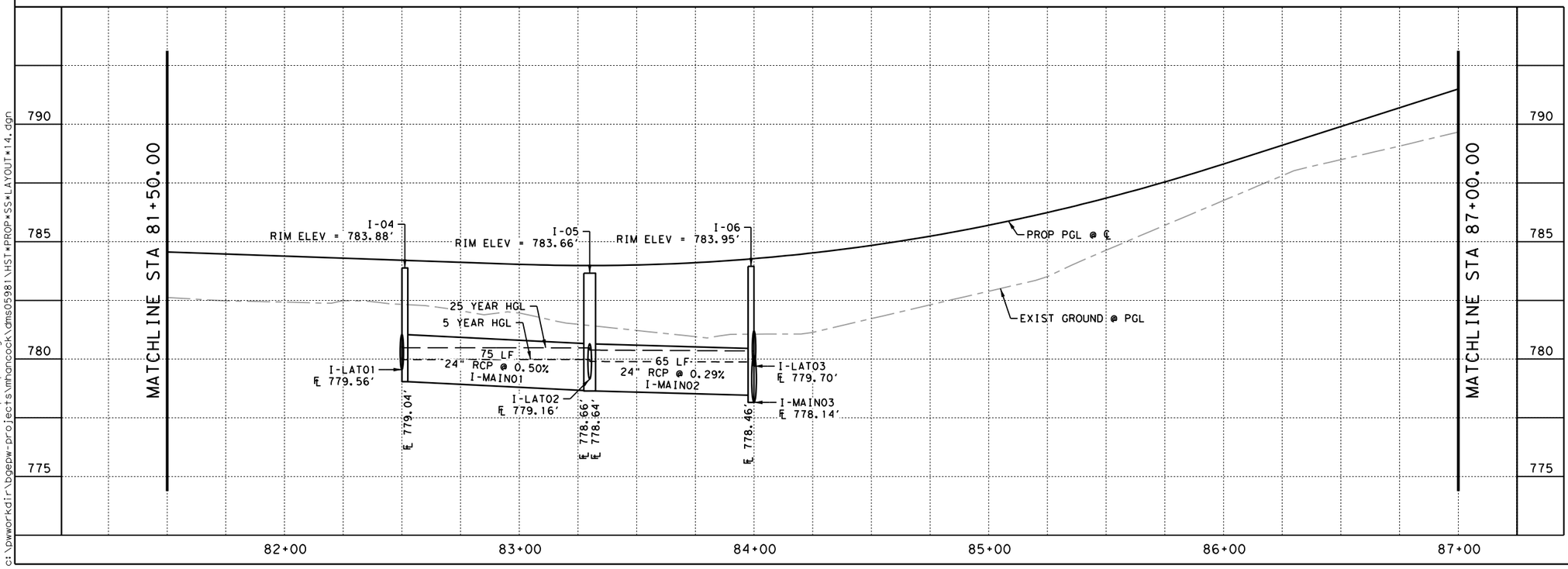
STORM SEWER PLAN & PROFILE

(SYSTEM H)

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APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V

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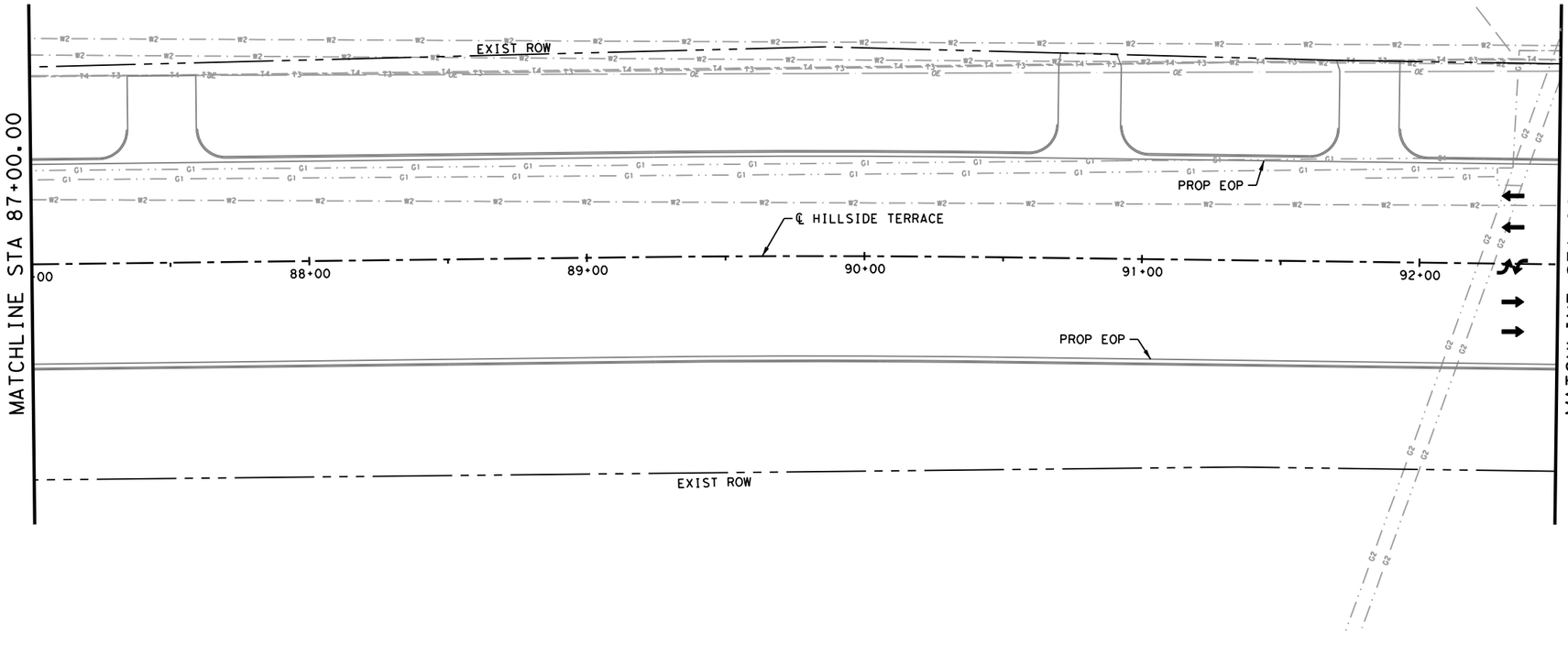
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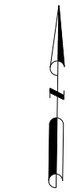
STORM SEWER PLAN & PROFILE

(SYSTEM I)

DESIGNED BY:		SHEET 14 OF 22
DRAWN BY:		175
CHECKED BY:		
APPROVED BY:		

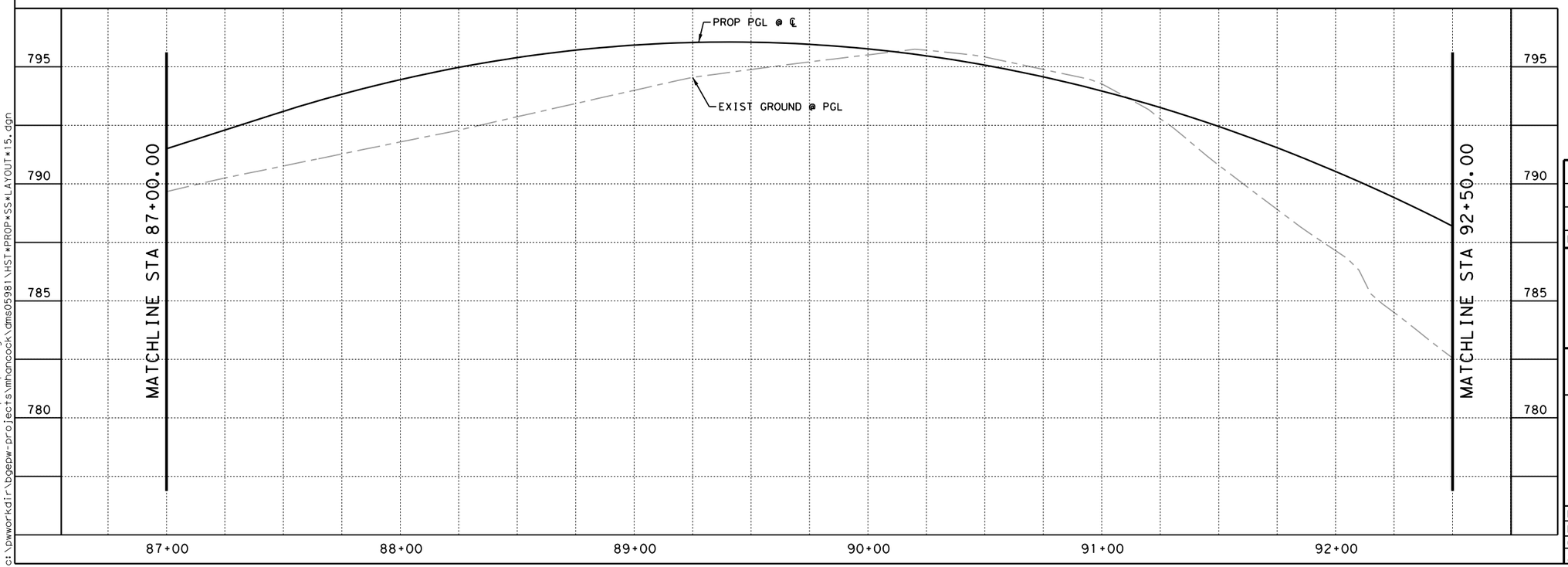
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0 25 50

SCALE: 1"=50' H
1"=5' V



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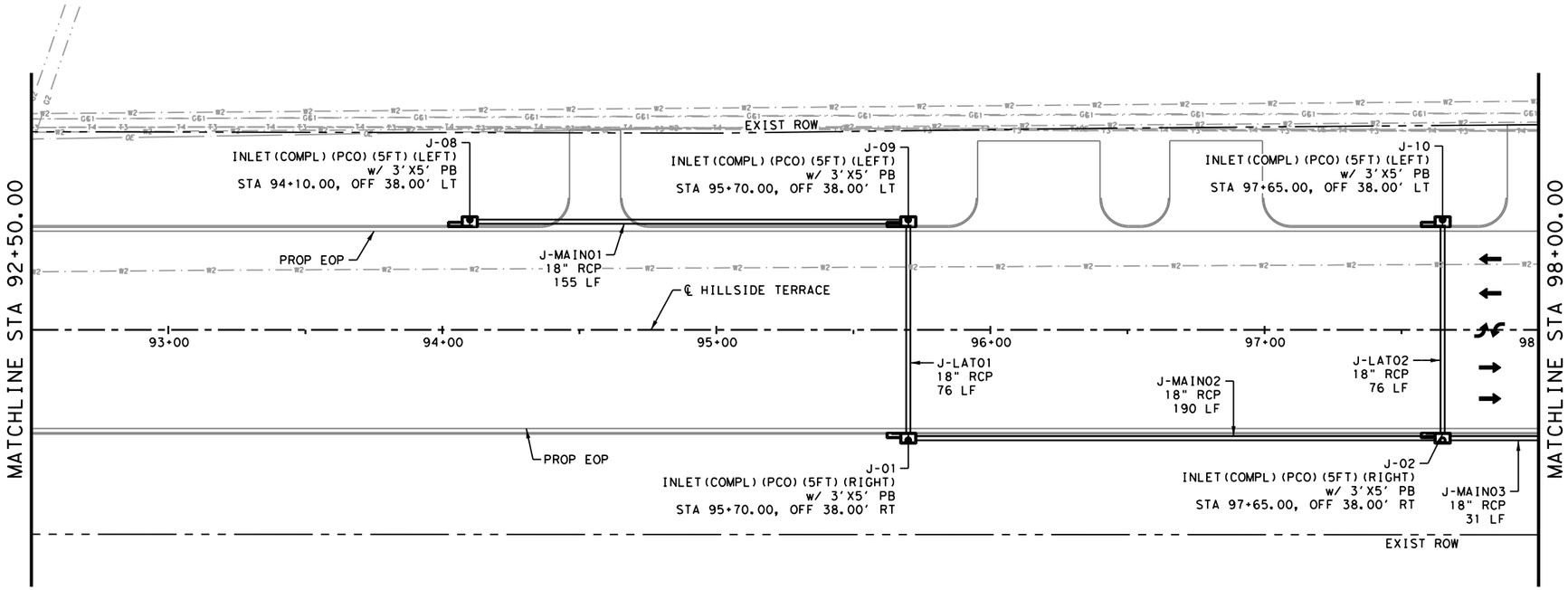
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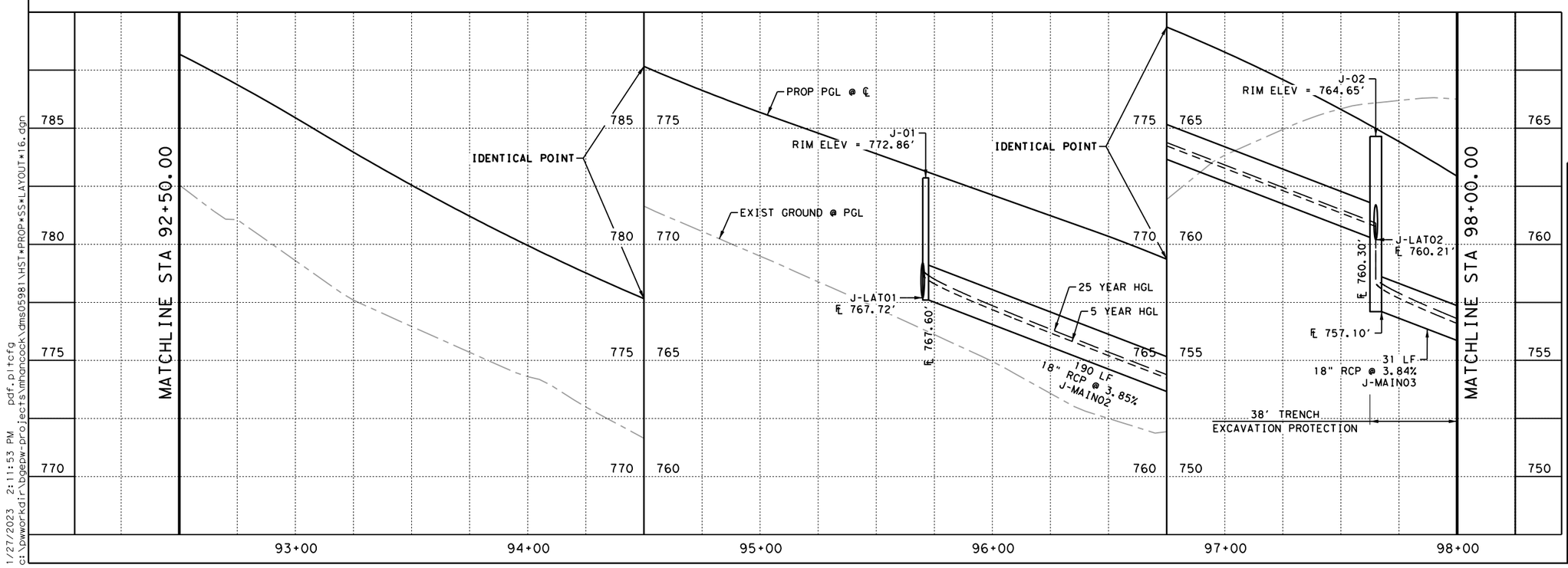
STORM SEWER ROADWAY PLAN & PROFILE

(SYSTEM I & J)

DESIGNED BY:		SHEET 15 OF 22
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0 25 50

SCALE: 1"=50' H
1"=5' V

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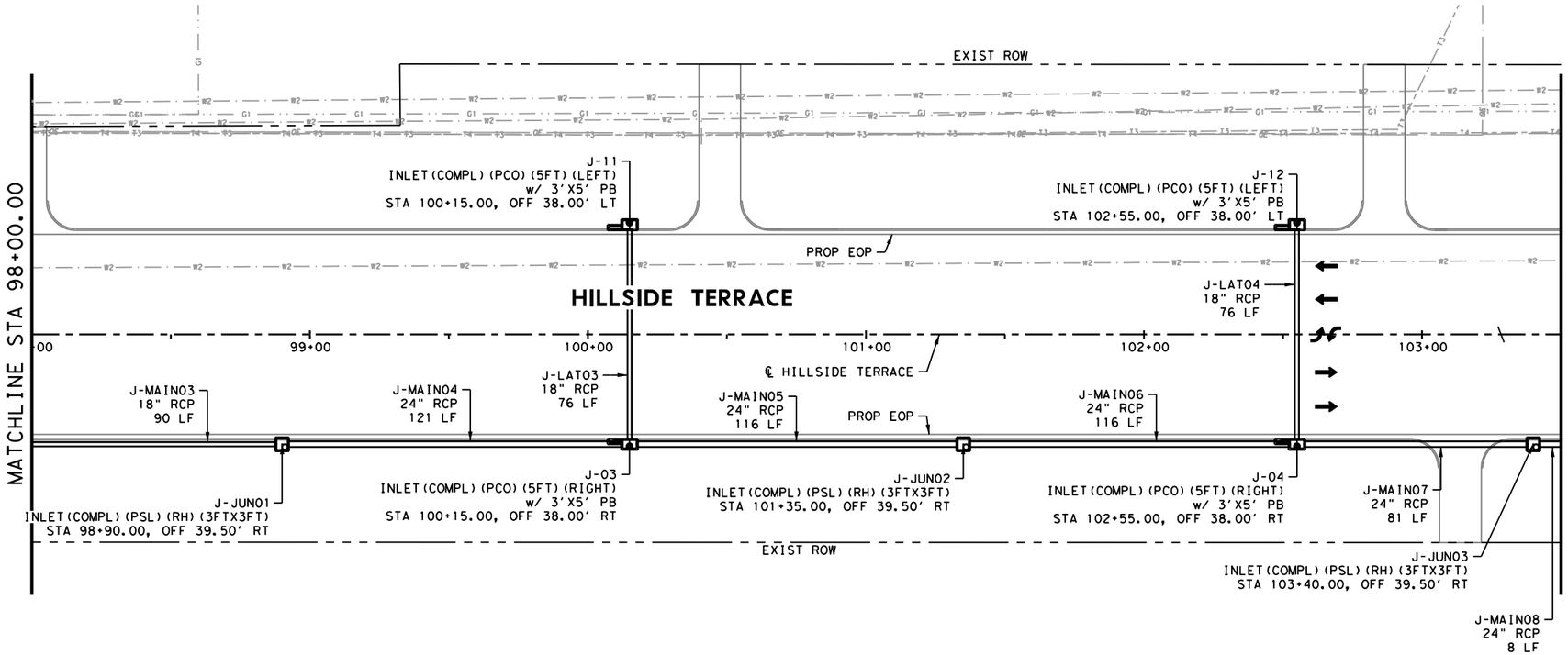
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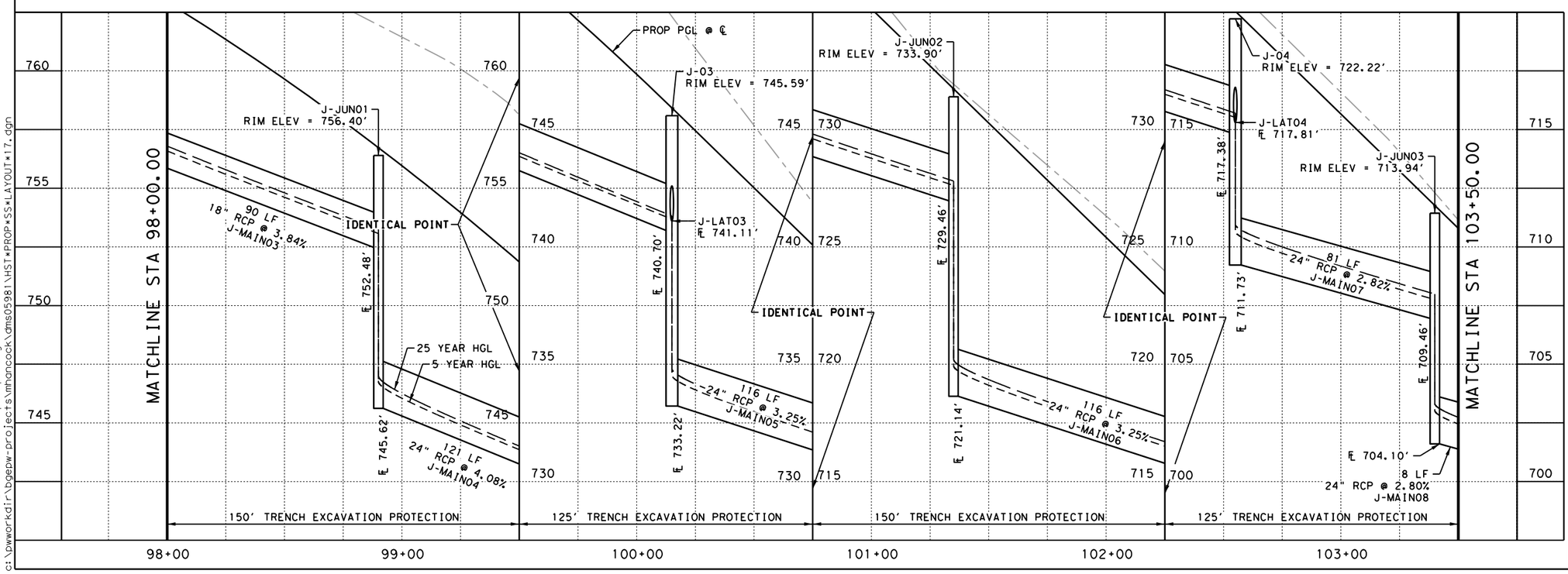
STORM SEWER PLAN & PROFILE

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SCALE: 1"=50' H
1"=5' V

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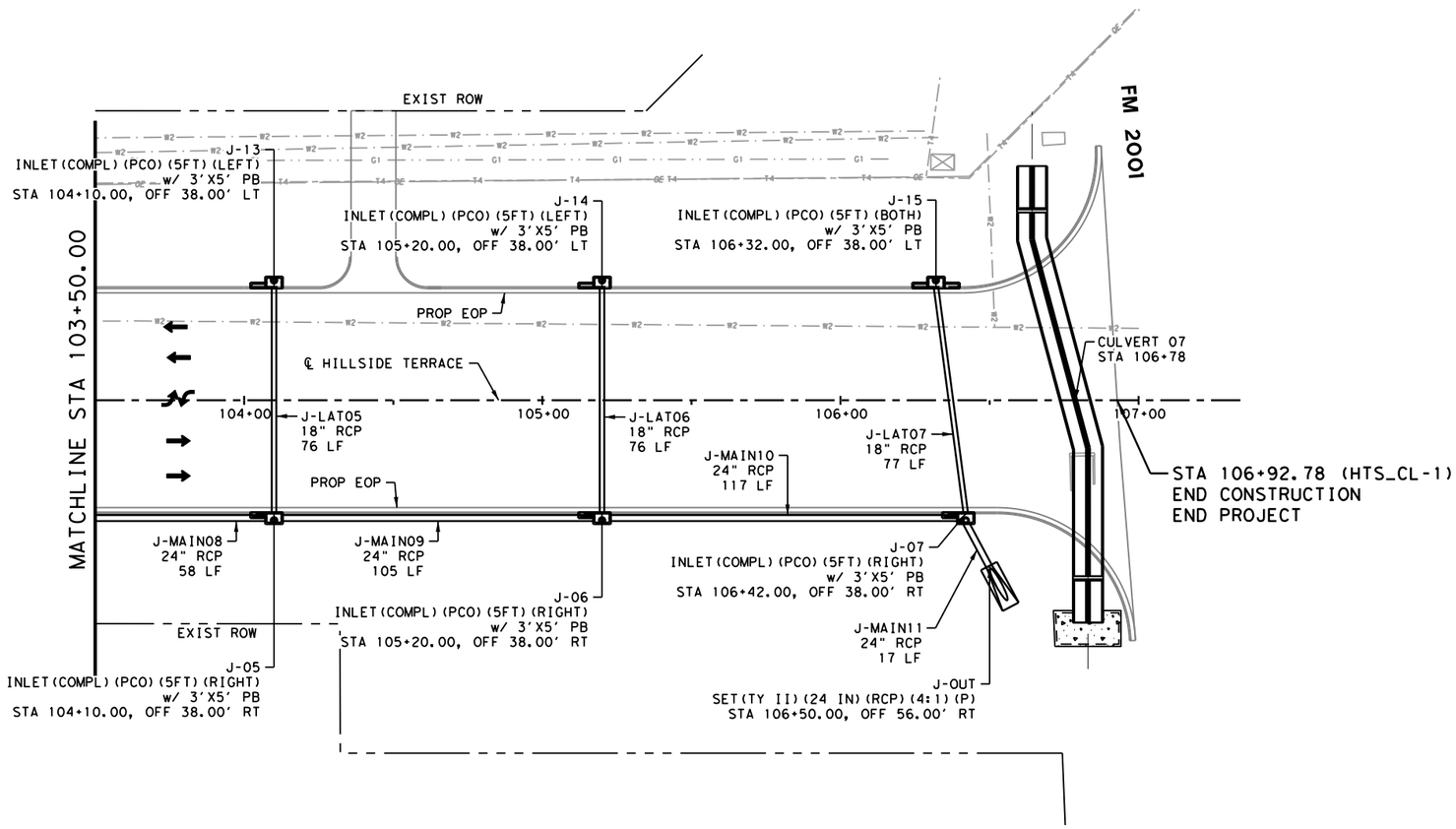
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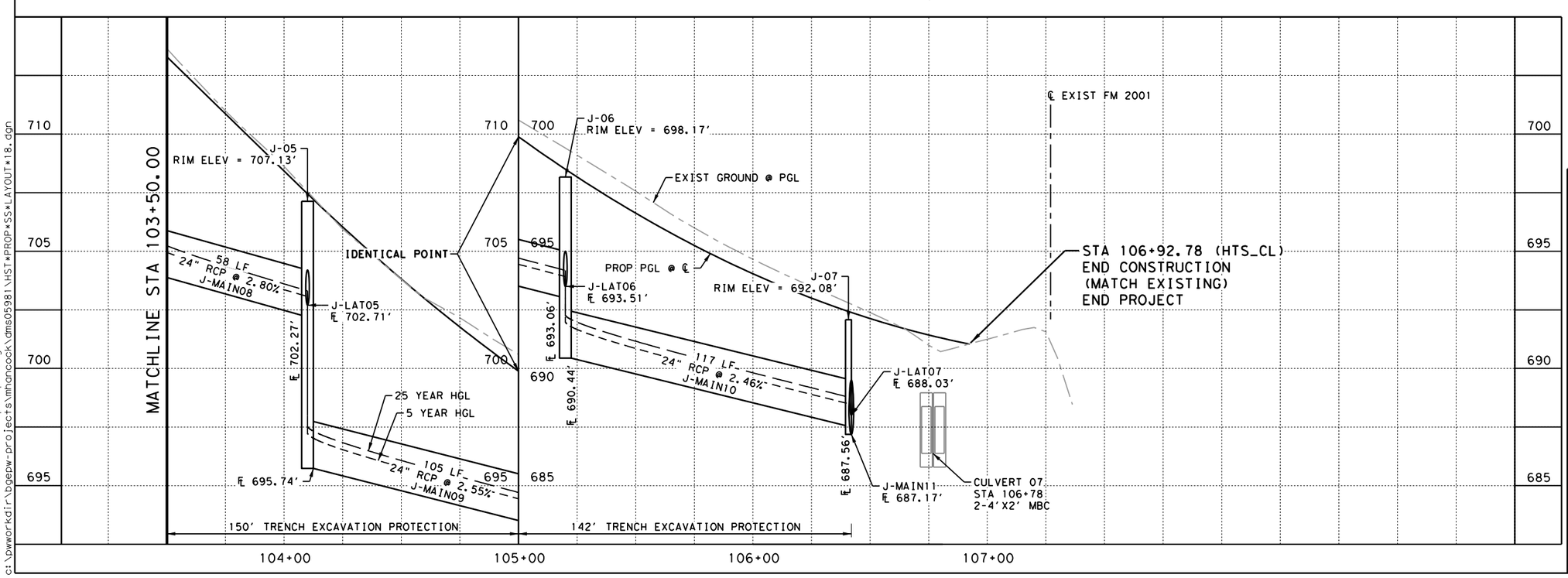
STORM SEWER PLAN & PROFILE

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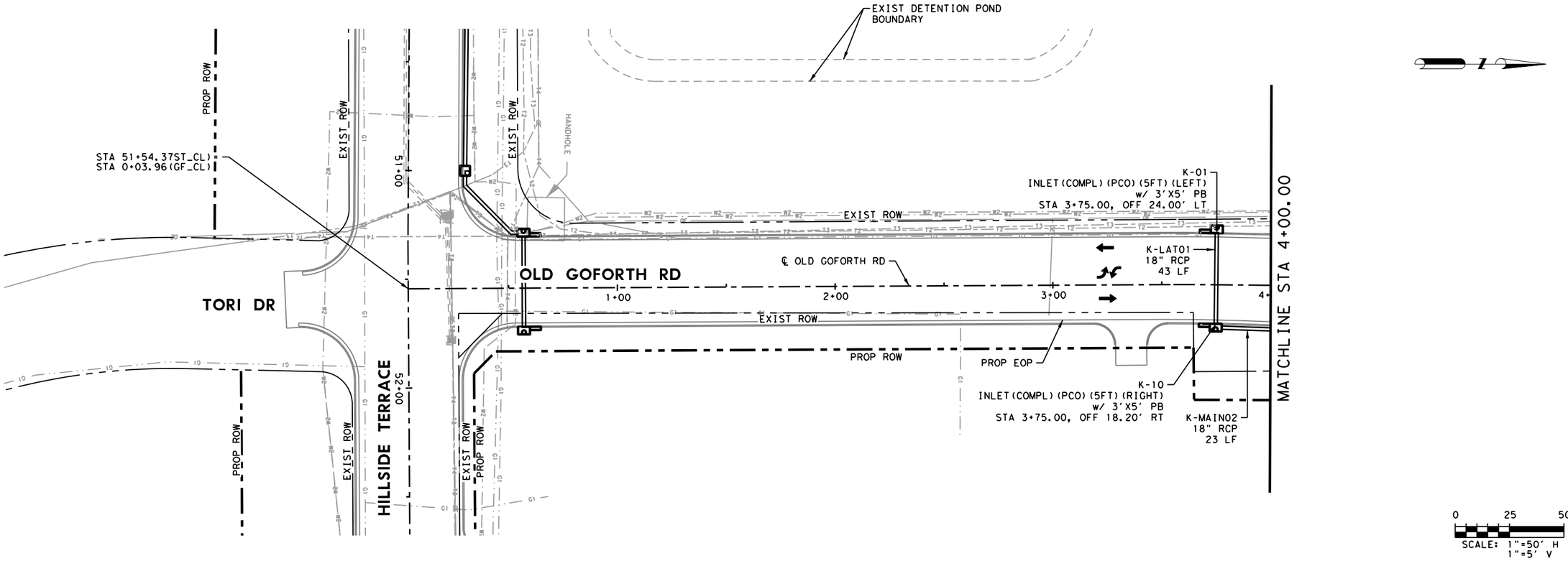
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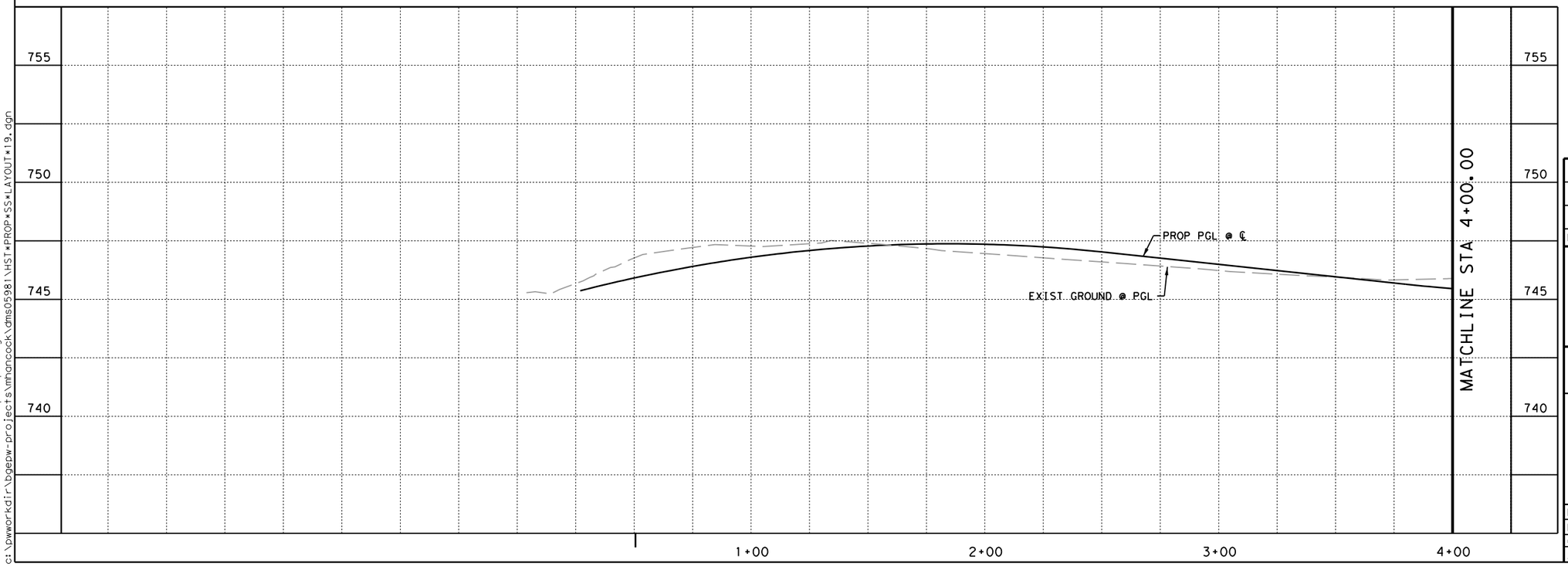
STORM SEWER PLAN & PROFILE

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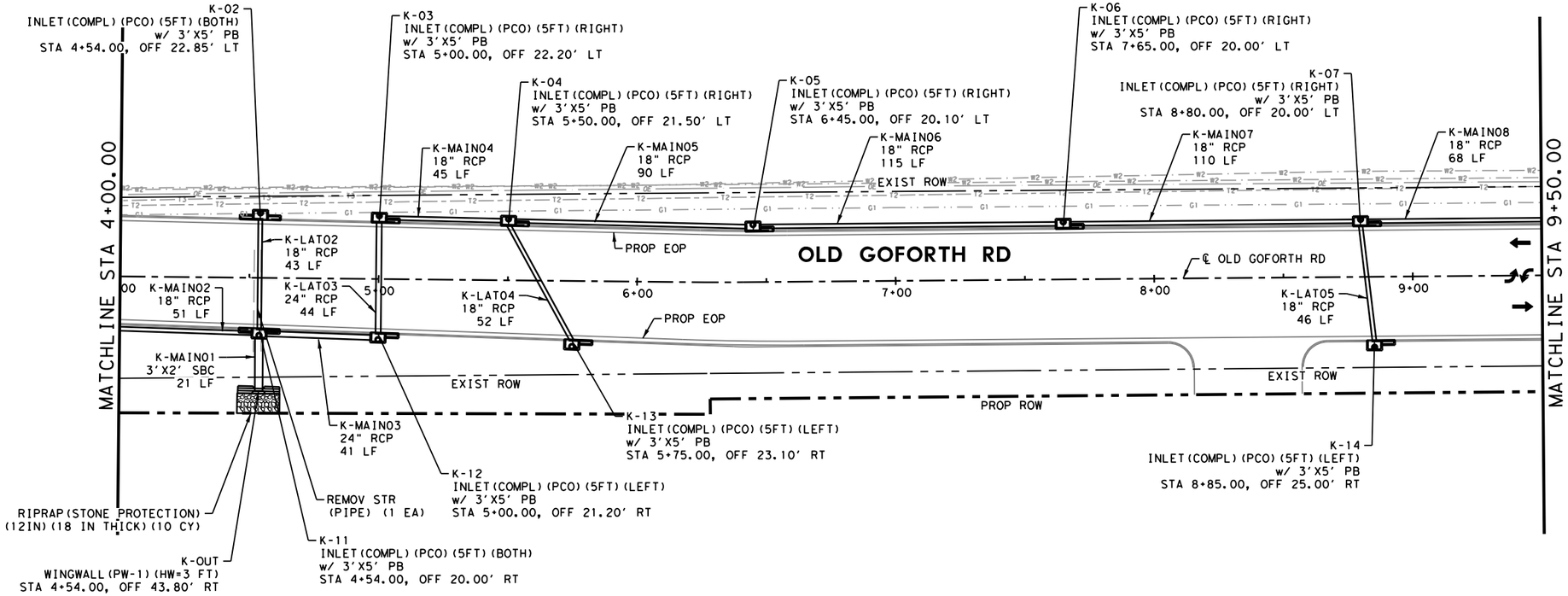
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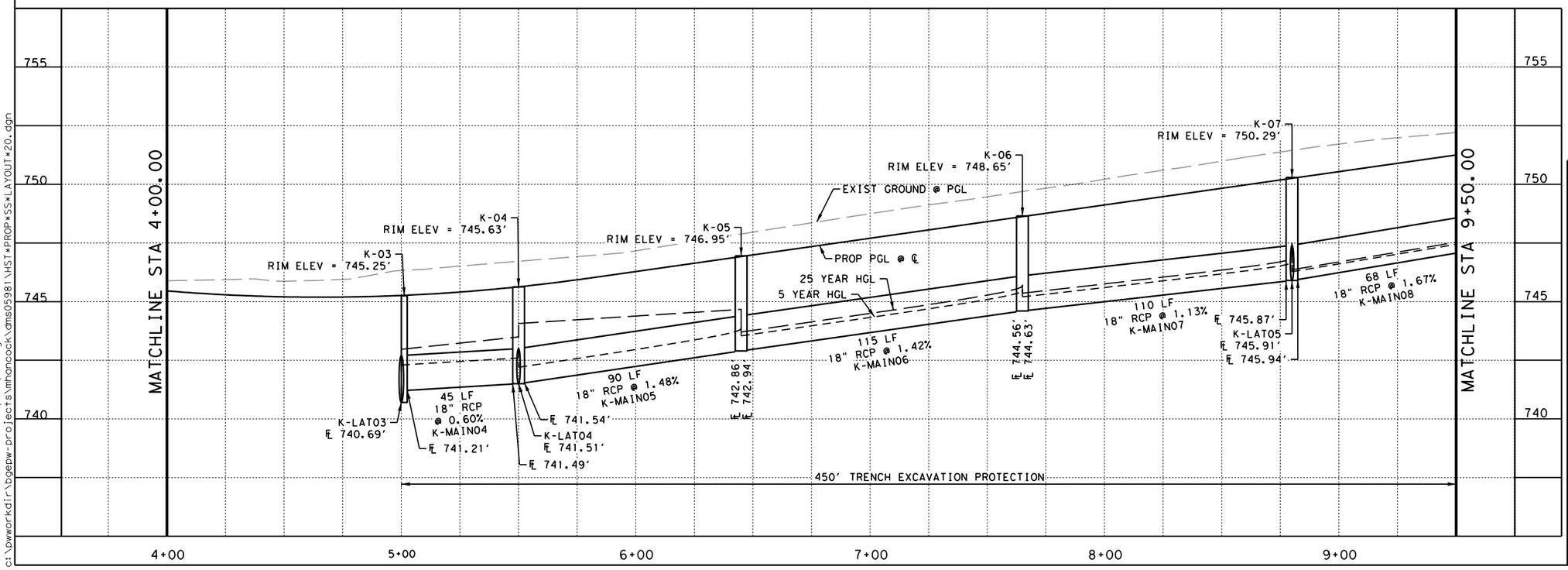
STORM SEWER PLAN & PROFILE

(SYSTEM K)

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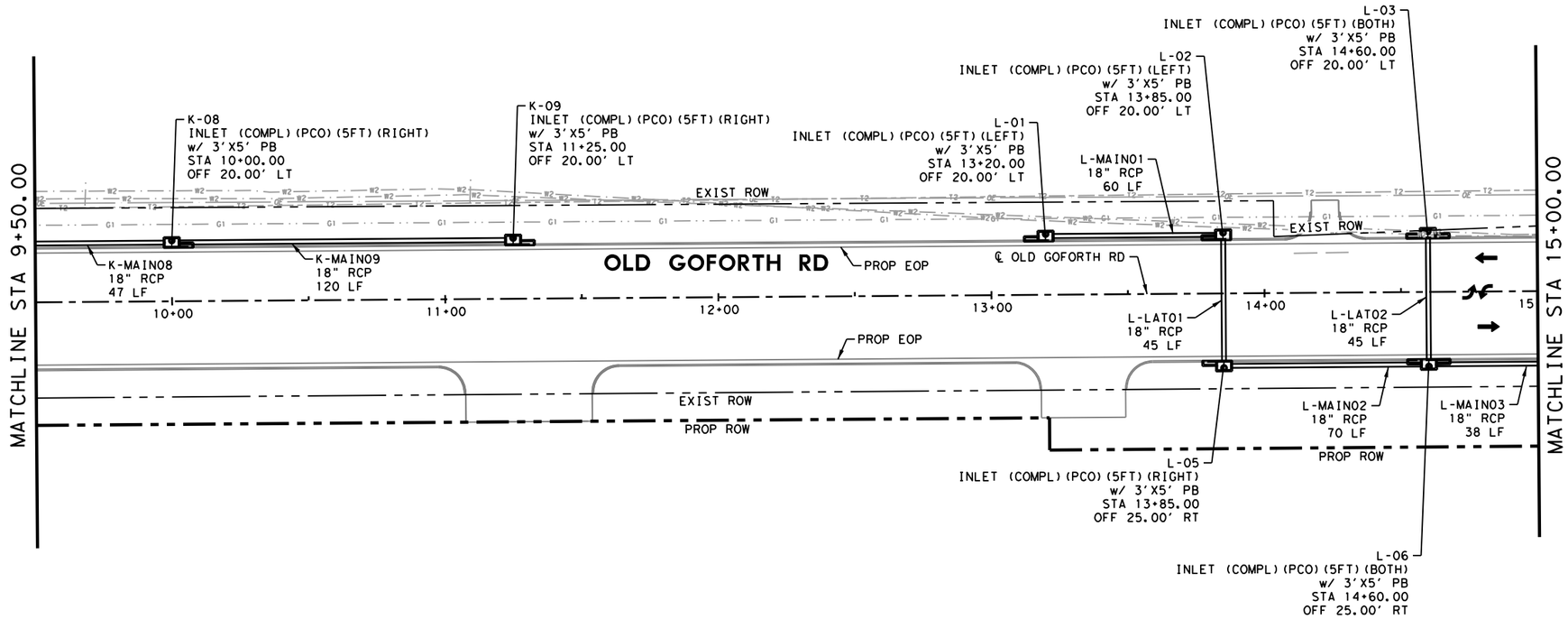
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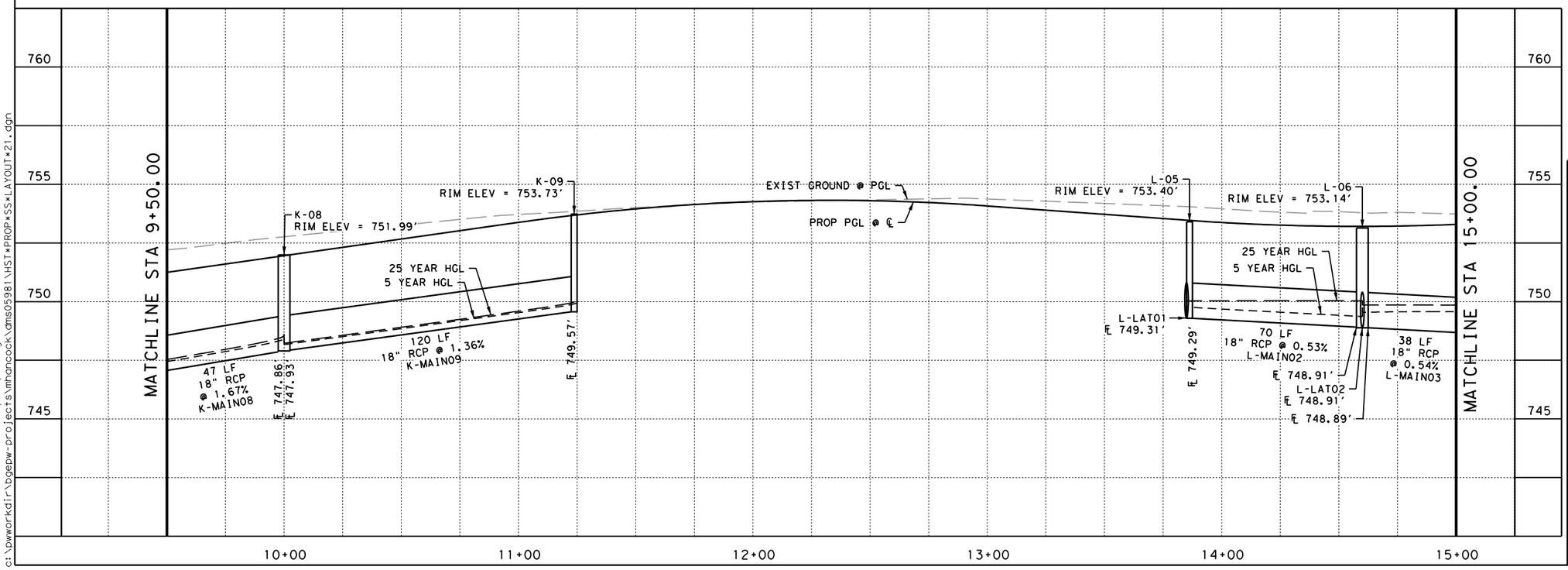
STORM SEWER PLAN & PROFILE

(SYSTEM K)

DESIGNED BY:		SHEET 20 OF 22
DRAWN BY:		181
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:12:13 PM pdf.pltcfg
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1/27/2023

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TBPE Registration No. F-1046

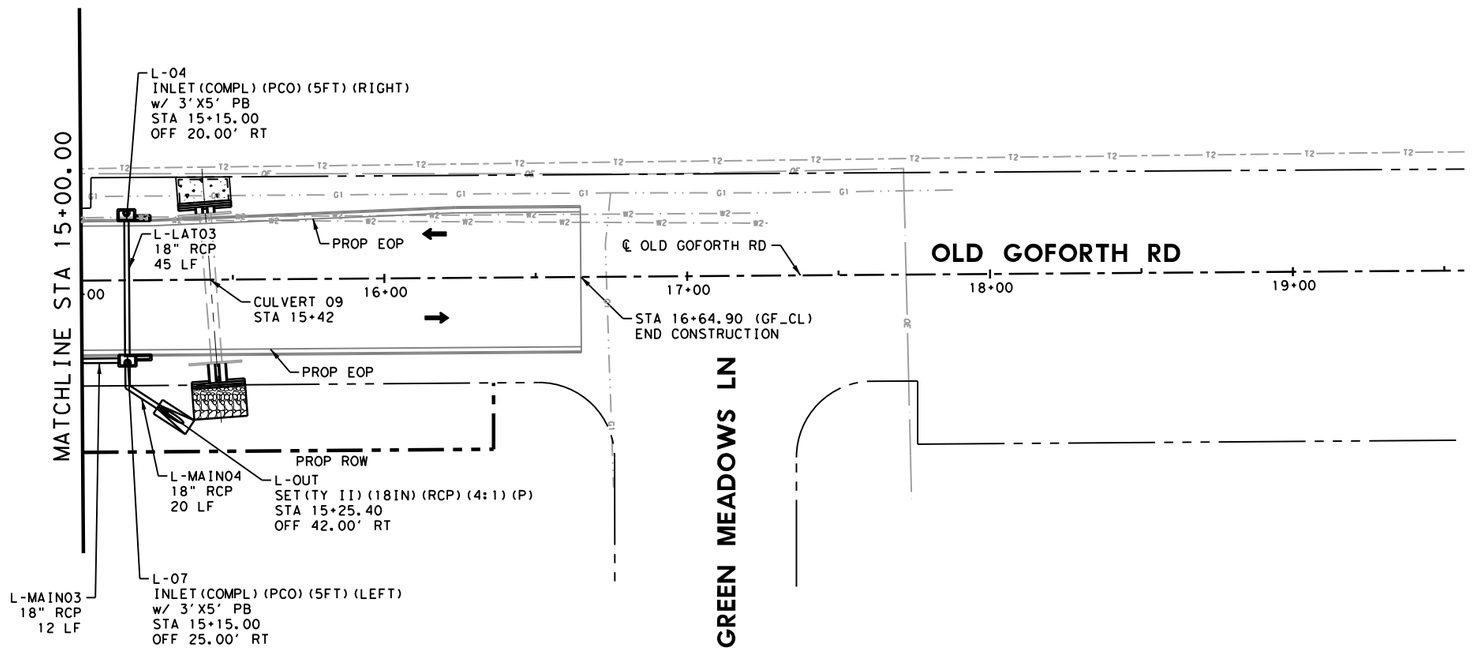
HILLSIDE TERRACE

STORM SEWER PLAN & PROFILE

(SYSTEM K & L)

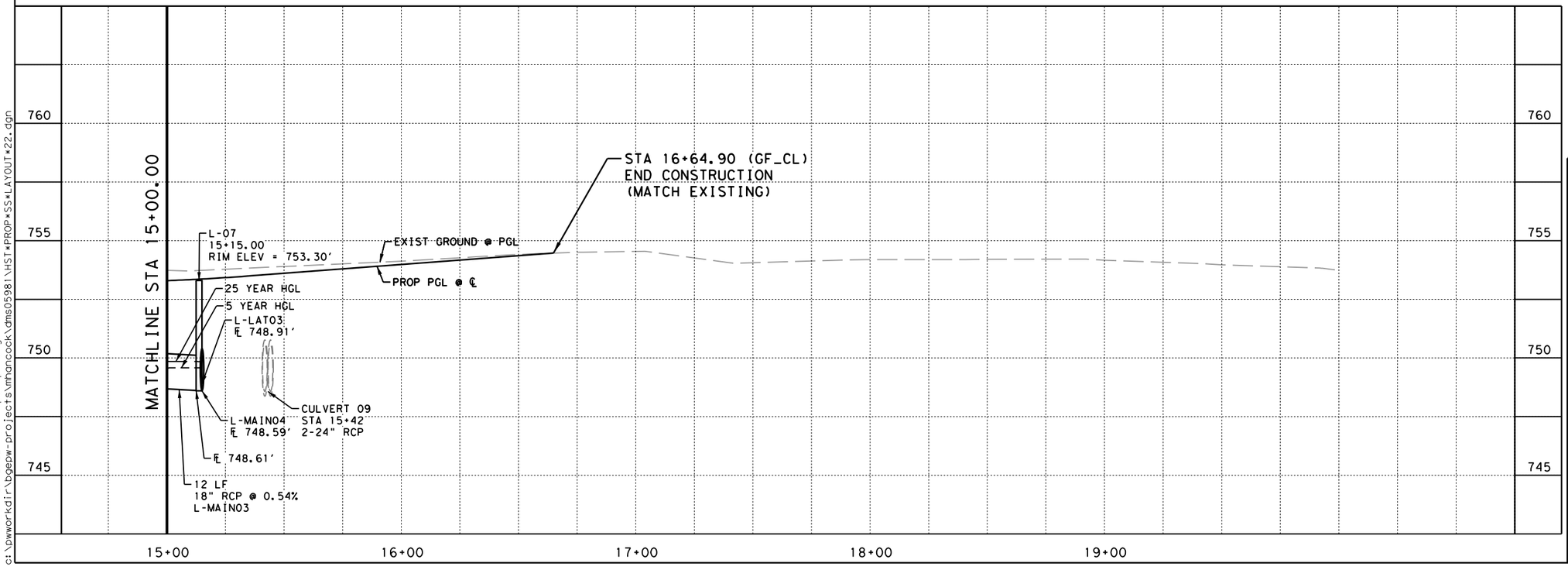
DESIGNED BY:		SHEET 21 OF 22
DRAWN BY:		182
CHECKED BY:		
APPROVED BY:		

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0 25 50

SCALE: 1"=50' H
1"=5' V



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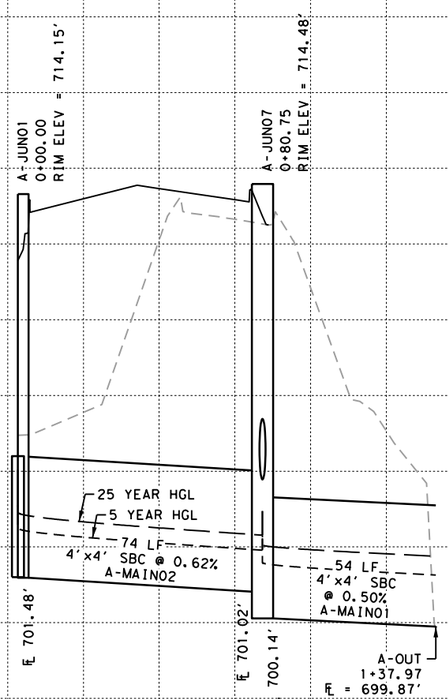
HILLSIDE TERRACE

STORM SEWER PLAN & PROFILE

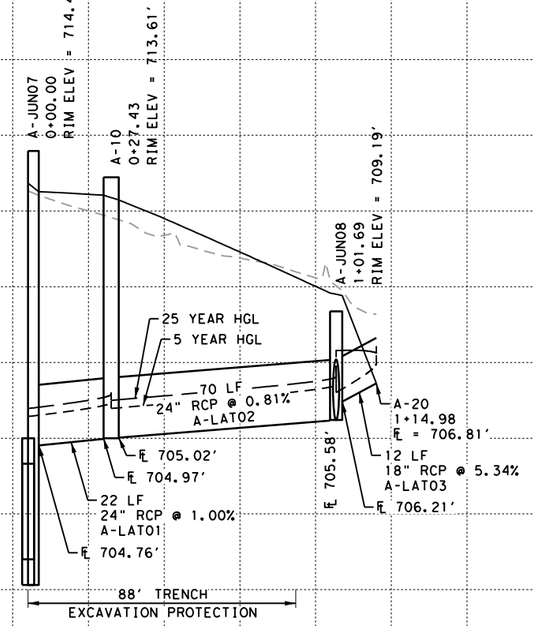
(SYSTEM L)

DESIGNED BY:		SHEET 22 OF 22
DRAWN BY:		183
CHECKED BY:		
APPROVED BY:		

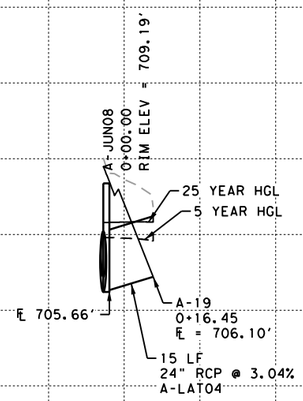
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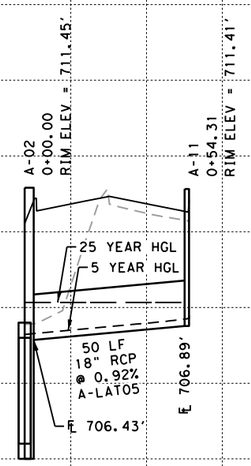
A-MAIN02, A-MAIN01



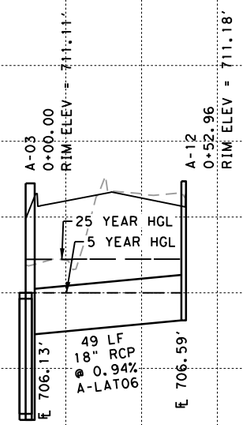
A-LAT01, A-LAT02, A-LAT03



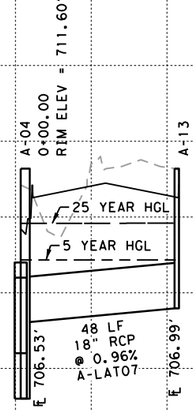
A-LAT04



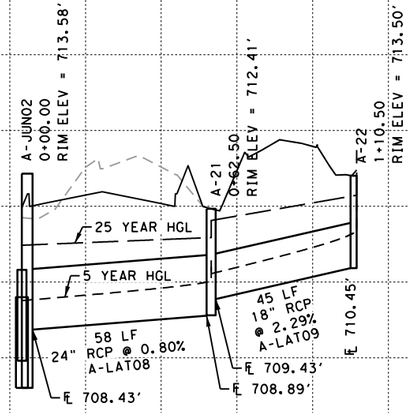
A-LAT05



A-LAT06



A-LAT07



A-LAT08, A-LAT09

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
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1/27/2023

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HAYS COUNTY, STATE OF TEXAS

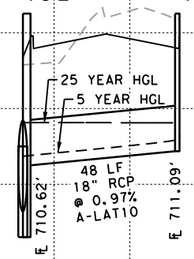
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HILLSIDE TERRACE

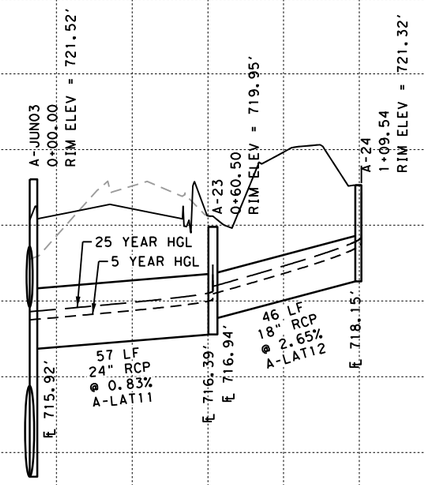
STORM SEWER LATERALS
(SYSTEM A)

DESIGNED BY:		SHEET 1 OF 10
DRAWN BY:		184
CHECKED BY:		
APPROVED BY:		

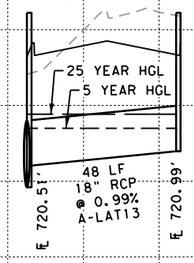
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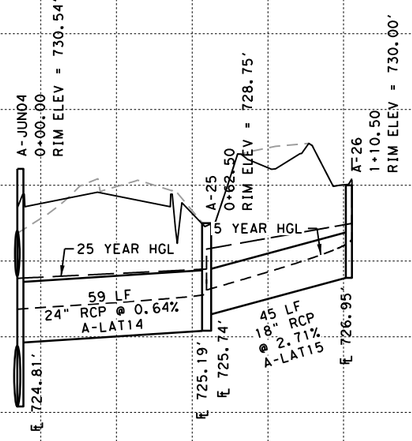
A-LAT10



A-LAT11, A-LAT12



A-LAT13



A-LAT14, A-LAT15

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

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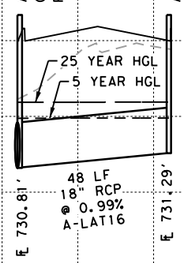
HILLSIDE TERRACE

STORM SEWER LATERALS

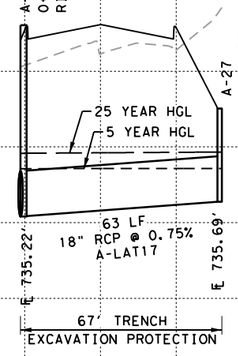
(SYSTEM A)

DESIGNED BY:		SHEET 2 OF 10
DRAWN BY:		185
CHECKED BY:		
APPROVED BY:		

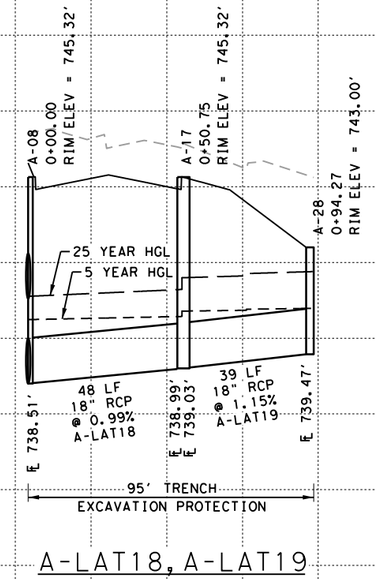
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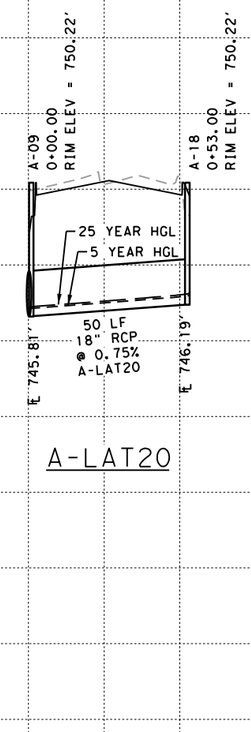
A-LAT16



A-LAT17



A-LAT18, A-LAT19



A-LAT20

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

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NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

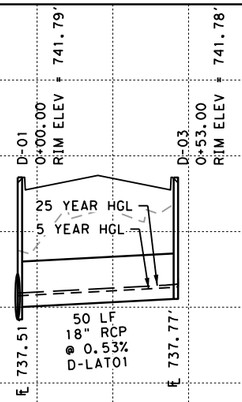
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HILLSIDE TERRACE

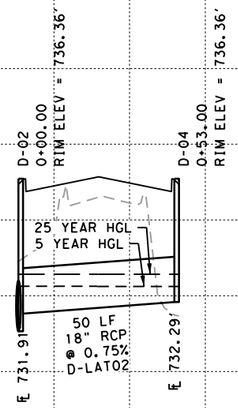
STORM SEWER LATERALS
(SYSTEM A)

DESIGNED BY:		SHEET 3 OF 10
DRAWN BY:		
CHECKED BY:		186
APPROVED BY:		

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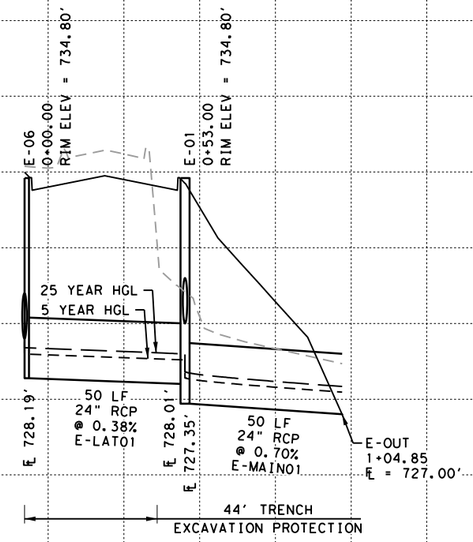


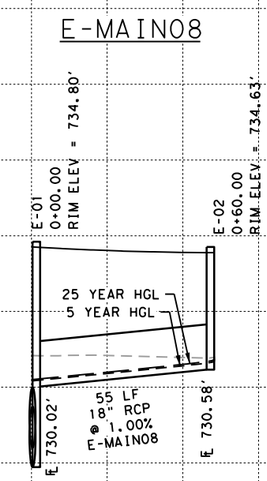
D-LAT01



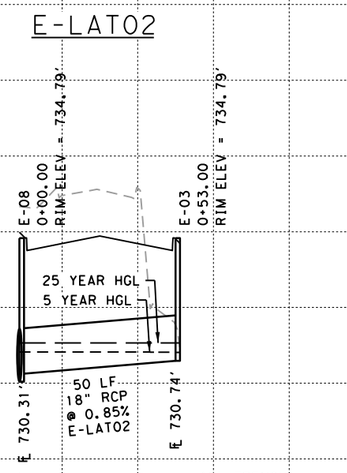
D-LAT02

E-LAT01, E-MAIN01

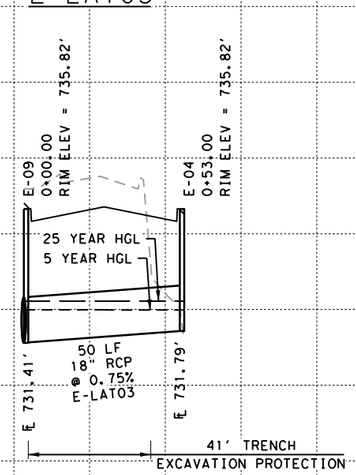




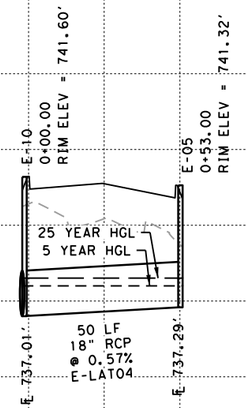
E-MAIN08



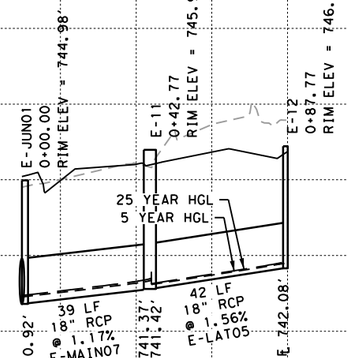
E-LAT02



E-LAT03



E-LAT04



E-MAIN07, E-LAT05

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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JOHN W. TULEY, PE No 102441
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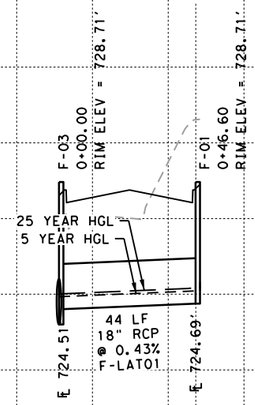
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HILLSIDE TERRACE

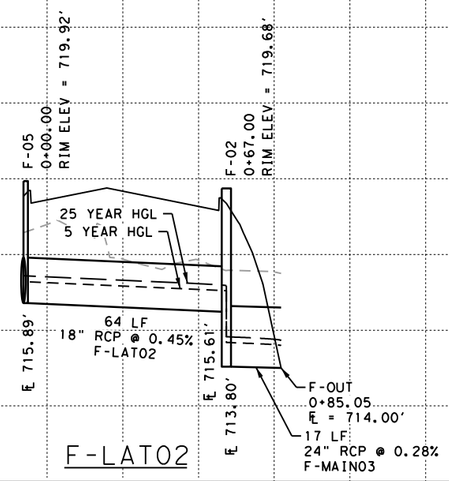
STORM SEWER LATERALS
(SYSTEM D & E)

DESIGNED BY:		SHEET 4 OF 10
DRAWN BY:		187
CHECKED BY:		
APPROVED BY:		

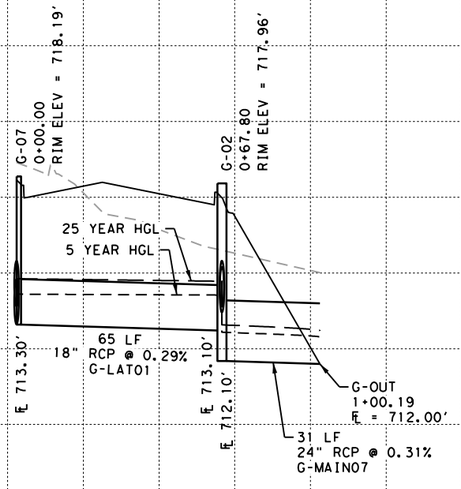
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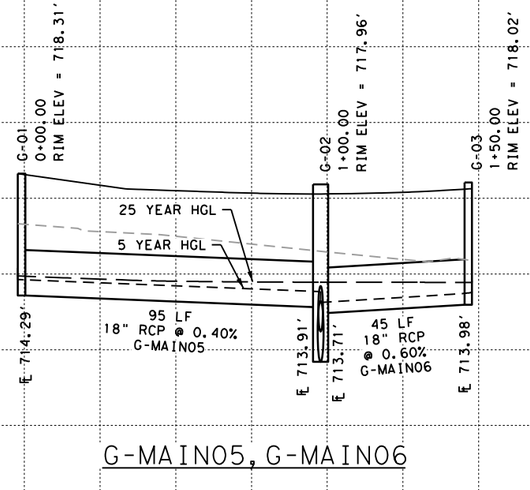
F-LAT01



F-LAT02



G-LAT01, G-MAIN07



G-MAIN05, G-MAIN06

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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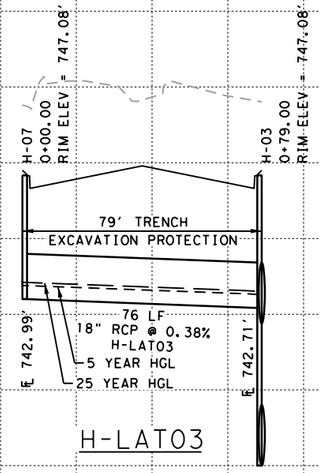
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HILLSIDE TERRACE

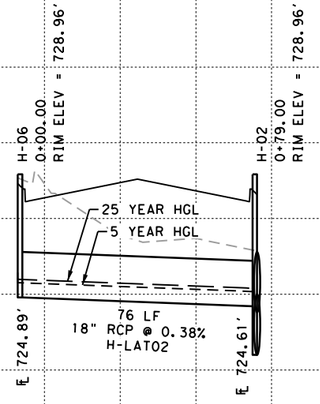
STORM SEWER LATERALS
(SYSTEM F & G)

DESIGNED BY:		SHEET 5 OF 10
DRAWN BY:		
CHECKED BY:		188
APPROVED BY:		

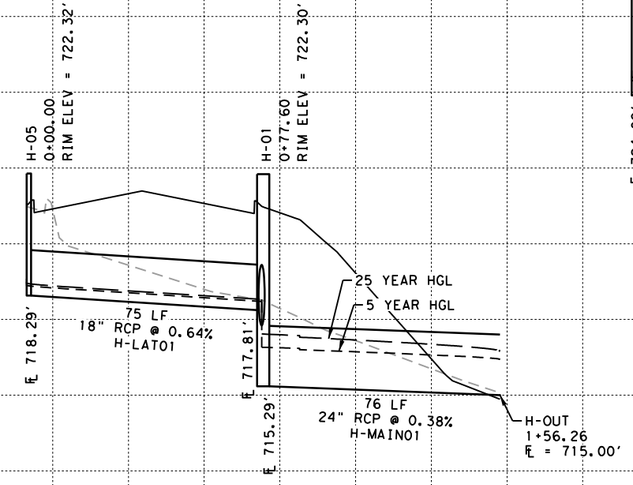
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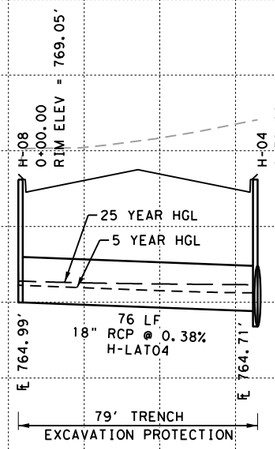
H-LAT03



H-LAT02



H-LAT01, H-MAIN01



H-LAT04

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

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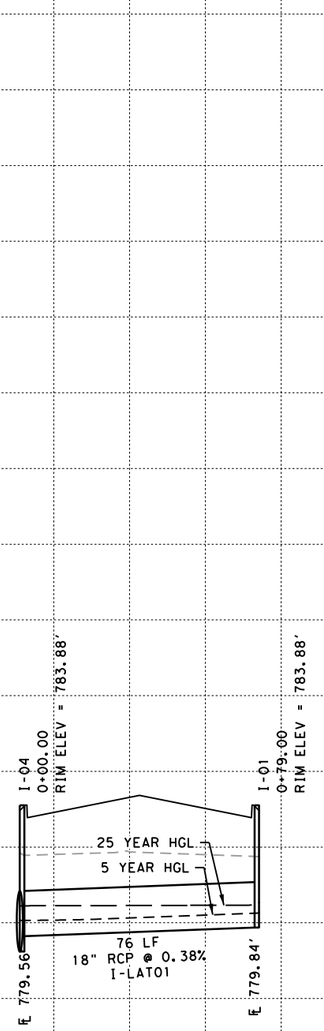
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TBPE Registration No. F-1046

HILLSIDE TERRACE

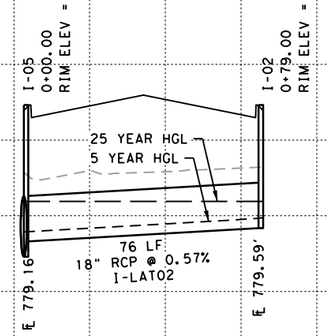
STORM SEWER LATERALS
(SYSTEM H)

DESIGNED BY:		SHEET 6 OF 10
DRAWN BY:		
CHECKED BY:		189
APPROVED BY:		

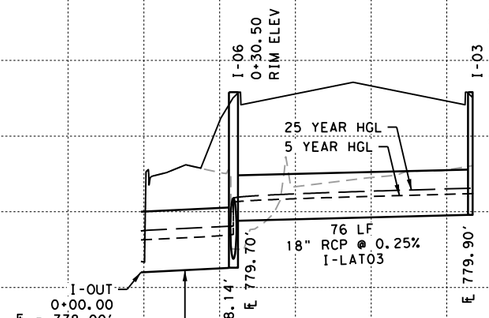
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I-LAT01



I-LAT02



I-MAIN03, I-LAT03

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

PRELIMINARY

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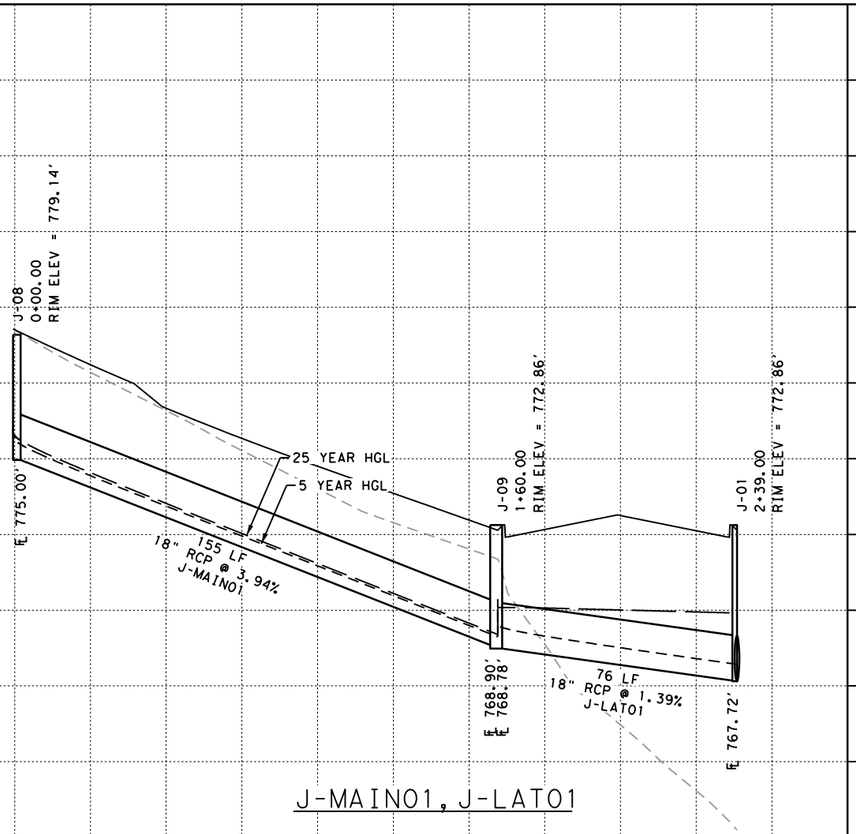
HILLSIDE TERRACE

STORM SEWER LATERALS

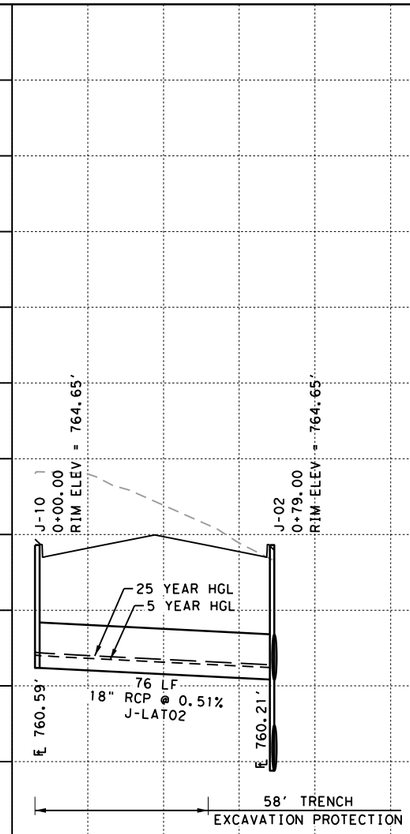
(SYSTEM I)

DESIGNED BY:		SHEET 7 OF 10
DRAWN BY:		190
CHECKED BY:		
APPROVED BY:		

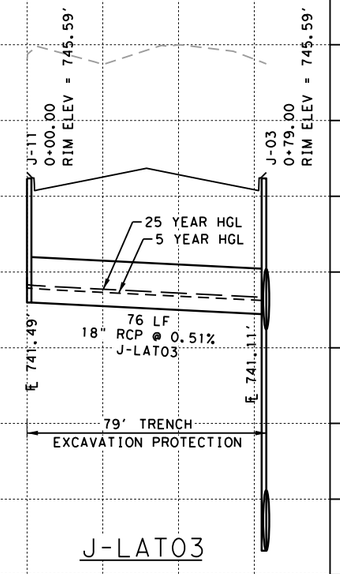
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J-MAIN01, J-LAT01



J-LAT02



J-LAT03

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

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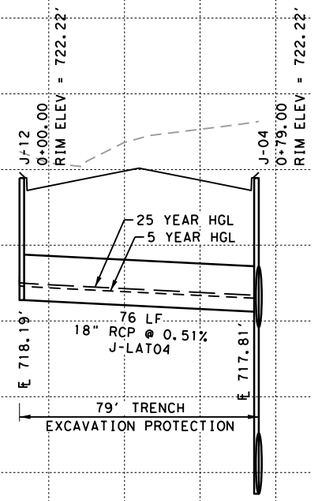
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HILLSIDE TERRACE

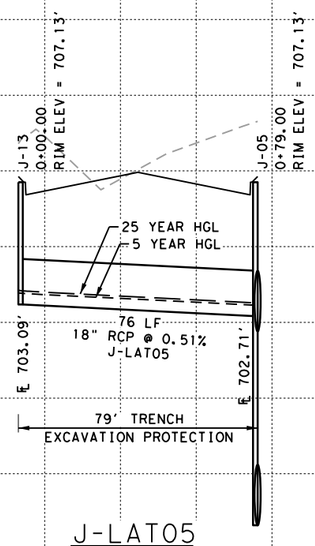
STORM SEWER LATERALS
(SYSTEM J)

DESIGNED BY:		SHEET 8 OF 10
DRAWN BY:		191
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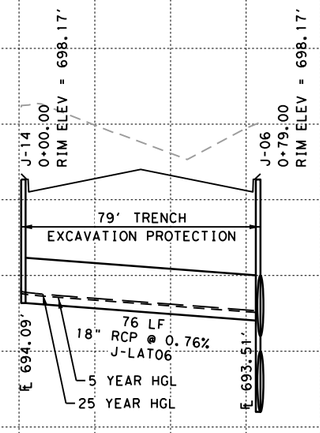
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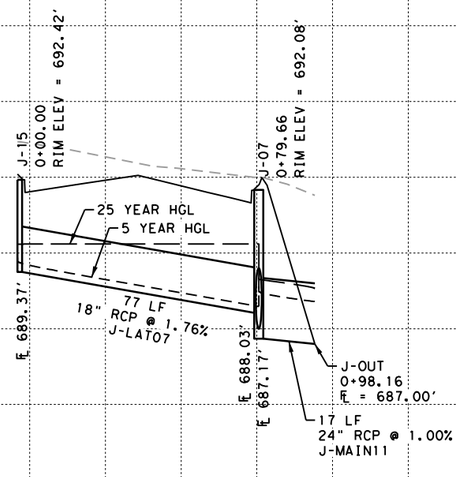
J-LAT04



J-LAT05



J-LAT06



J-LAT07, J-MAIN11

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

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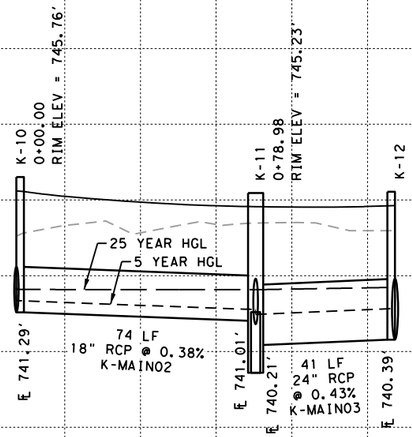
HILLSIDE TERRACE

STORM SEWER LATERALS

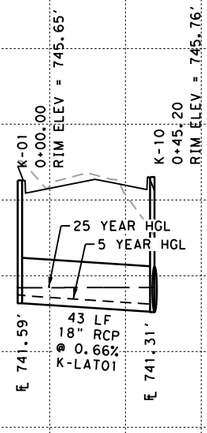
(SYSTEM J)

DESIGNED BY:		SHEET 9 OF 10
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CHECKED BY:		
APPROVED BY:		

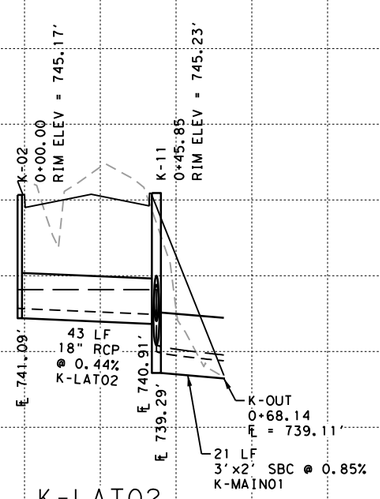
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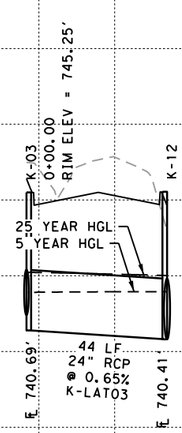
K-MAIN02, K-MAIN03



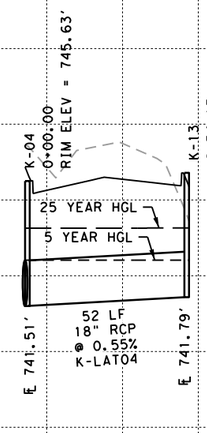
K-LAT01



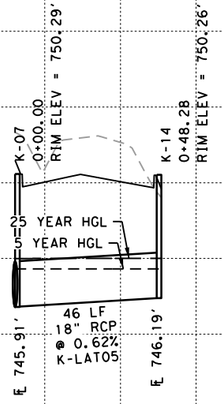
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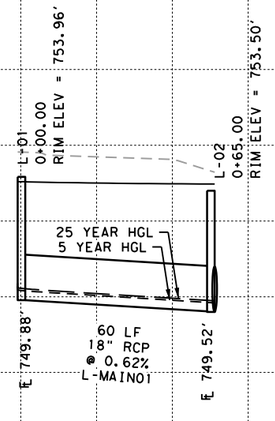
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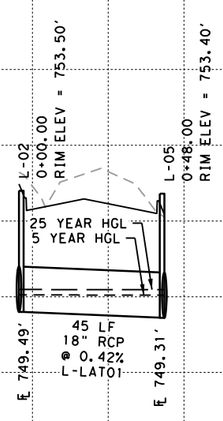
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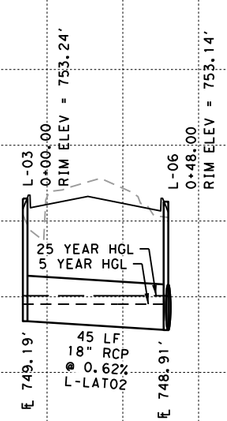
K-LAT05



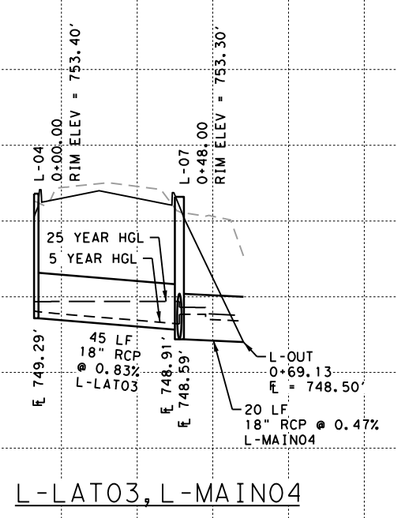
L-MAIN01



L-LAT01



L-LAT02



L-LAT03, L-MAIN04

LEGEND:

- EXISTING GROUND
- PROPOSED GROUND
- 5-YR HGL
- 25-YR HGL

0 25 50

SCALE: 1"=50' H
1"=5' V

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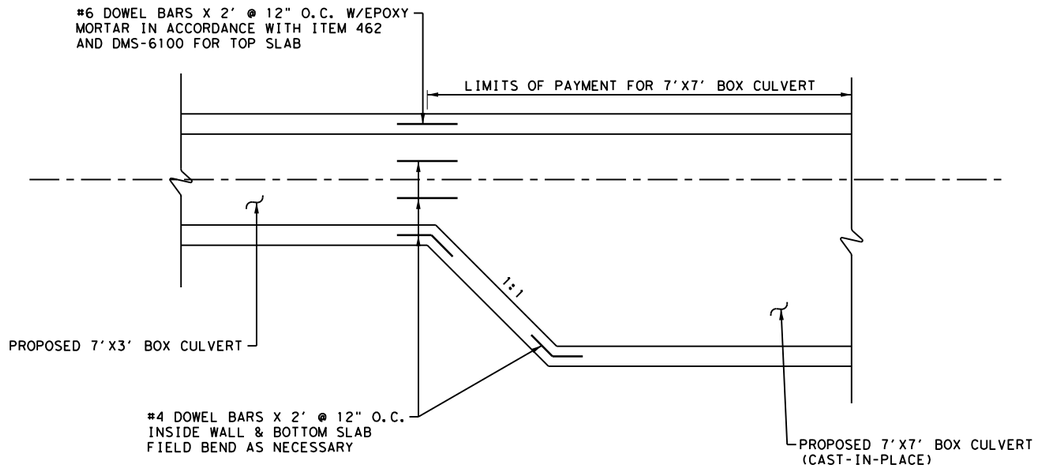
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HILLSIDE TERRACE

STORM SEWER LATERALS
(SYSTEM K & L)

DESIGNED BY:		SHEET 10 OF 10
DRAWN BY:		193
CHECKED BY:		
APPROVED BY:		

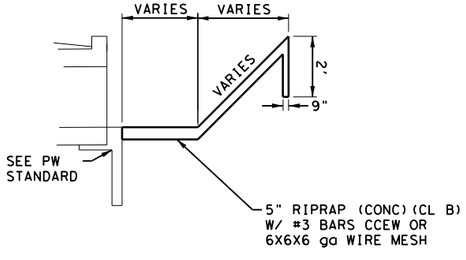
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CULVERT 03 DETAIL

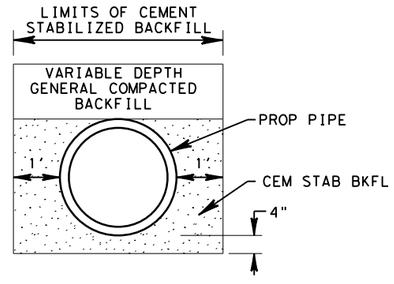
N.T.S.

SEE MC-7-10 STANDARD FOR ADDITIONAL INFORMATION



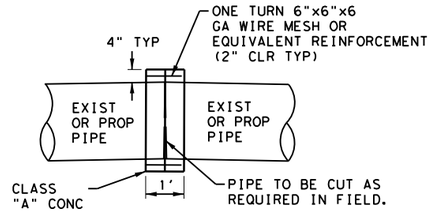
CULVERT RIPRAP DETAIL

N.T.S.



CEMENT STABILIZED BACKFILL DETAIL

SECTION VIEW (N.T.S.)



PIPE COLLAR DETAIL

N.T.S.

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HILLSIDE TERRACE

CULVERT DETAILS

DESIGNED BY:		SHEET 1 OF 1
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CHECKED BY:		194
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Culvert Station and/or Creek Name followed by applicable end (Lt, Rt or Both)	Description of Box Culvert No. Spans ~ Span X Height	Max Fill Height (Ft)	Applicable Box Culvert Standard (4)	Applicable Wingwall or End Treatment Standard	Skew Angle (0°,15°, 30° or 45°)	Side Slope or Channel Slope Ratio (SL:1)	T Culvert Top Slab Thickness (In)	U Culvert Wall Thickness (In)	C Estimated Curb Height (Ft)	Hw (1) Height of Wingwall (Ft)	A Curb to End of Wingwall (Ft)	B Offset of End of Wingwall (Ft)	Lw Length of Longest Wingwall (Ft)	Ltw Culvert Toewall Length (Ft)	Atw Anchor Toewall Length (Ft)	Riprap Apron (CY)	Class "C" Conc (Curb) (2) (CY)	Class "C" Conc (Wingwall) (3) (CY)	Total Wingwall Area (SF)
Culvert 3 (Lt)	2 ~ 7'x 3'	1.85'	SCP-7	PW-1	15°	2:1	8"	7"	1.333'	5.000'	N/A	N/A	10.353'	17.427'	N/A	0.0	0.9	7.8	104
Culvert 3 (Rt)	2 ~ 7'x 7'	1.85'	SCP-7	PW-1	15°	2:1	8"	8"	1.333'	9.000'	N/A	N/A	18.635'	17.772'	N/A	0.0	0.9	23.1	335
Culvert 4 (Lt)	3 ~ 5'x 3'	1.65'	SCP-5	PW-1	15°	2:1	8"	6"	2.333'	6.000'	N/A	N/A	12.423'	19.670'	N/A	0.0	1.7	10.6	149
Culvert 4 (Rt)	3 ~ 5'x 3'	1.65'	SCP-5	PW-1	15°	2:1	8"	6"	2.333'	6.000'	N/A	N/A	12.423'	19.670'	N/A	0.0	1.7	10.6	149
Culvert 5 (Lt)	3 ~ 5'x 4'	1.78'	SCP-5	PW-1	15°	2:1	8"	6"	1.833'	6.500'	N/A	N/A	13.459'	19.670'	N/A	0.0	1.3	11.9	175
Culvert 5 (Rt)	3 ~ 5'x 4'	1.78'	SCP-5	PW-1	15°	2:1	8"	6"	1.833'	6.500'	N/A	N/A	13.459'	19.670'	N/A	0.0	1.3	11.9	175
Culvert 7 (Both)	2 ~ 4'x 2'	2.43'	SCP-4	SETB-PD	0°	6:1	5"	5"	0.833'	3.000'	N/A	N/A	16.500'	N/A	10.500'	0.0	0.6	11.4	N/A
Storm Sewer System A (RT)	1 ~ 4'x 4'	9.8'	SCP-4	PW-1	15°	2:1	5"	5"	0.417'	4.833'	N/A	N/A	10.008'	5.004'	N/A	0.0	0.1	6.7	97
Storm Sewer System K (RT)	1 ~ 3'x 2'	7.5'	SCP-3	PW-1	0°	2:1	4"	4"	0.417'	2.750'	N/A	N/A	5.500'	3.667'	N/A	0.0	0.1	2.6	30

NOTES:
Skew = 0° on SW-0, FW-0, SETB-CD, SETB-SW-0, and SETB-FW-0 standard sheets;
30° maximum for safety end treatment

SL:1 = Horizontal : 1 Vertical
- Side slope at culvert for flared or straight wingwalls.
- Channel slope for parallel wingwalls.
- Slope must be 3:1 or flatter for safety end treatments.

T = Box culvert top slab thickness. Dimension can be found on the applicable box culvert standard sheet.

U = Box culvert wall thickness. Dimension can be found on the applicable box culvert standard sheet.

C = Curb height

See applicable wing or end treatment standard sheets for calculations of Hw, A, B, Lw, Ltw, Atw, and Total Wingwall Area.

Hw = Height of wingwall

A = Distance from face of curb to end of wingwall (not applicable to parallel or straight wingwalls)

B = Offset of end of wingwall (not applicable to parallel or straight wingwalls)

Lw = Length of longest wingwall.

Ltw = Length of culvert toewall (not applicable when using riprap apron)

Atw = Length of anchor toewall (applicable to safety end treatment only)
Total Wingwall Area = Wingwall area in sq. ft. for two wingwalls (one structure end) if Lt or Rt.
Area for four wingwalls (two structure ends) if Both.

(1) Round the wall heights shown to the nearest foot for bidding purposes.

(2) Concrete volume shown is for box culvert curb only. For curbs using the Box Culvert Rail Mounting Details (RAC) standard sheet quantities shown must be increased by a factor of 2.25. If Class S concrete is required for the top slab of the culvert, also provide Class S concrete for the curb. Curb concrete is considered part of the Box Culvert for payment.

(3) Concrete volume shown is total of wings, footings, culvert toewall (if any), anchor toewalls (if any) and wingwall toewalls. Riprap aprons, culverts, and curb quantities are not included.

(4) Regardless of the type of culvert shown on this sheet, the Contractor has the option of furnishing cast-in-place or precast culverts unless otherwise shown elsewhere on the plans. If the Contractor elects to provide culverts of a different type than those shown on this sheet, it is the Contractor's responsibility to make the necessary adjustments to the dimensions and quantities shown.

SPECIAL NOTE:

This sheet is a supplement to the box culvert standards. It is to be filled out by the culvert specifier and provides dimensions for the construction of the box culvert wingwalls and safety end treatments.

An Excel 2010 spreadsheet to assist in completing this table can be downloaded from the Bridge Standards (English) web page on the TxDOT web site. The completed sheet must be signed, sealed, and dated by a licensed Professional Engineer.

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1/27/2023

Texas Department of Transportation

Bridge Division Standard

BOX CULVERT SUPPLEMENT
WINGS AND END TREATMENTS

BCS

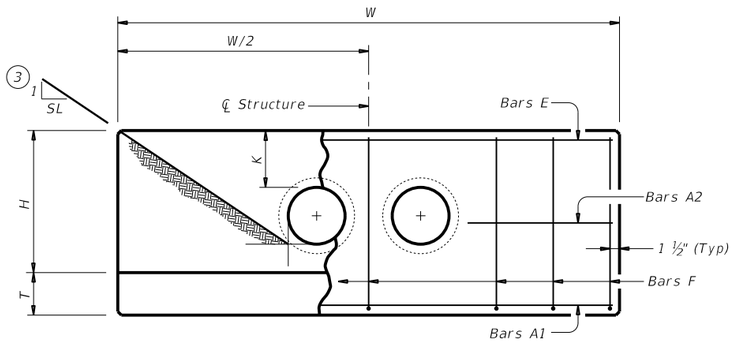
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		195

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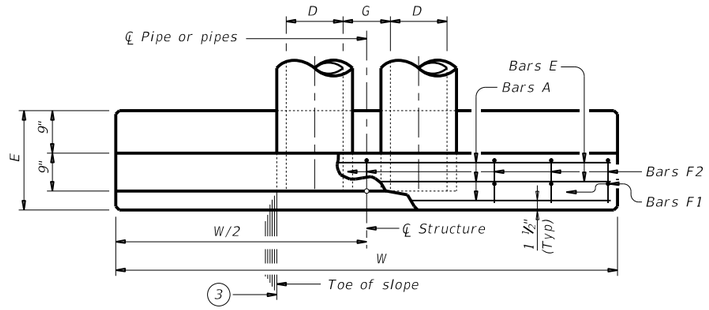
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TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

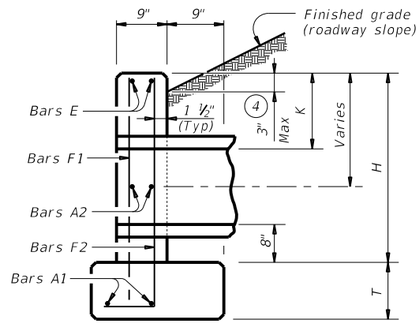
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		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 0"	122	1.1	1' – 9"	15	0.2
	15"	10' – 3"	136	1.3	2' – 2"	16	0.2
	18"	11' – 6"	163	1.5	2' – 8"	19	0.3
	21"	12' – 9"	200	1.8	3' – 1"	31	0.4
	24"	14' – 0"	217	2.1	3' – 7"	34	0.4
	27"	15' – 3"	254	2.4	3' – 11"	37	0.5
	30"	16' – 6"	272	2.7	4' – 4"	40	0.6
	33"	17' – 9"	314	3.1	4' – 8"	43	0.6
	36"	19' – 0"	371	3.9	5' – 1"	46	0.8
	42"	21' – 6"	442	4.9	5' – 10"	52	1.0
	48"	25' – 0"	569	6.4	6' – 7"	59	1.3
	54"	27' – 6"	701	7.5	7' – 6"	82	1.6
	60"	30' – 0"	794	8.8	8' – 3"	90	1.8
	66"	32' – 6"	894	10.2	8' – 9"	96	2.0
	72"	35' – 0"	1,055	11.7	9' – 4"	103	2.3
3:1	12"	13' – 0"	175	1.6	1' – 9"	14	0.2
	15"	14' – 9"	193	1.9	2' – 2"	17	0.2
	18"	16' – 6"	228	2.2	2' – 8"	19	0.3
	21"	18' – 3"	299	2.6	3' – 1"	31	0.4
	24"	20' – 0"	323	3.0	3' – 7"	33	0.4
	27"	21' – 9"	371	3.5	3' – 11"	37	0.5
	30"	23' – 6"	415	4.0	4' – 4"	40	0.5
	33"	25' – 3"	469	4.6	4' – 8"	43	0.6
	36"	27' – 0"	556	5.7	5' – 1"	46	0.8
	42"	30' – 6"	675	7.1	5' – 10"	52	1.0
	48"	35' – 6"	837	9.2	6' – 7"	59	1.3
	54"	39' – 0"	1,015	11.0	7' – 6"	84	1.6
	60"	42' – 6"	1,171	12.9	8' – 3"	91	1.8
	66"	46' – 0"	1,298	14.9	8' – 9"	98	2.0
	72"	49' – 6"	1,561	17.1	9' – 4"	103	2.3
4:1	12"	17' – 0"	229	2.0	1' – 9"	15	0.2
	15"	19' – 3"	266	2.4	2' – 2"	17	0.2
	18"	21' – 6"	308	2.9	2' – 8"	19	0.3
	21"	23' – 9"	382	3.5	3' – 1"	31	0.3
	24"	26' – 0"	430	3.9	3' – 7"	34	0.4
	27"	28' – 3"	486	4.7	3' – 11"	37	0.5
	30"	30' – 6"	539	5.2	4' – 4"	40	0.6
	33"	32' – 9"	603	6.0	4' – 8"	42	0.6
	36"	35' – 0"	738	7.5	5' – 1"	47	0.8
	42"	39' – 6"	881	9.3	5' – 10"	52	1.0
	48"	46' – 0"	1,102	12.1	6' – 7"	61	1.3
	54"	50' – 6"	1,364	14.4	7' – 6"	84	1.6
	60"	55' – 0"	1,547	16.9	8' – 3"	91	1.8
	66"	59' – 6"	1,741	19.5	8' – 9"	98	2.0
	72"	64' – 0"	2,077	22.4	9' – 4"	102	2.3
6:1	12"	25' – 0"	336	3.0	1' – 9"	14	0.2
	15"	28' – 3"	384	3.6	2' – 2"	17	0.2
	18"	31' – 6"	452	4.2	2' – 8"	19	0.3
	21"	34' – 9"	581	5.1	3' – 1"	31	0.4
	24"	38' – 0"	644	5.8	3' – 7"	34	0.4
	27"	41' – 3"	737	6.9	3' – 11"	37	0.5
	30"	44' – 6"	807	7.7	4' – 4"	39	0.6
	33"	47' – 9"	912	8.9	4' – 8"	44	0.6
	36"	51' – 0"	1,108	11.0	5' – 1"	48	0.8
	42"	57' – 6"	1,318	13.7	5' – 10"	54	1.0
	48"	67' – 0"	1,682	17.9	6' – 7"	59	1.3
	54"	73' – 6"	2,072	21.3	7' – 6"	83	1.6
	60"	80' – 0"	2,351	24.9	8' – 3"	89	1.8
	66"	86' – 6"	2,643	28.9	8' – 9"	96	2.0
	72"	93' – 0"	3,121	33.1	9' – 4"	101	2.3



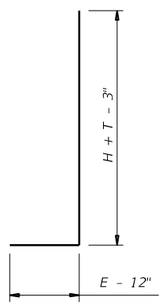
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

(1) Total quantities include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 0"
24"	1' – 7"	2' – 0"	4' – 8"	0' – 9"	2' – 6"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

1

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

PRELIMINARY
SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

1/27/2023

Texas Department of Transportation — Bridge Division Standard

CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0(MOD)

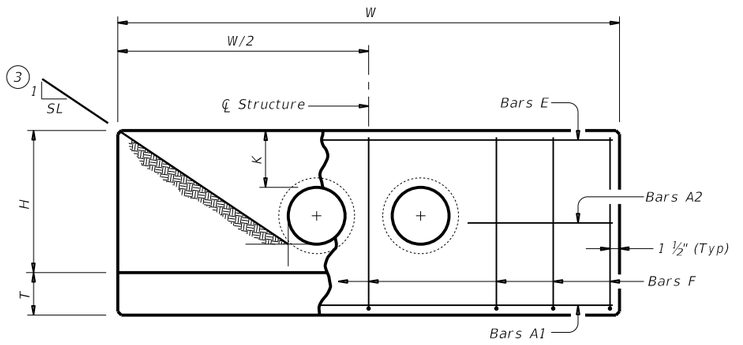
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
1 EXTENDED HEADWALL	DIST	COUNTY		SHEET NO.
	AUS	HAYS		196

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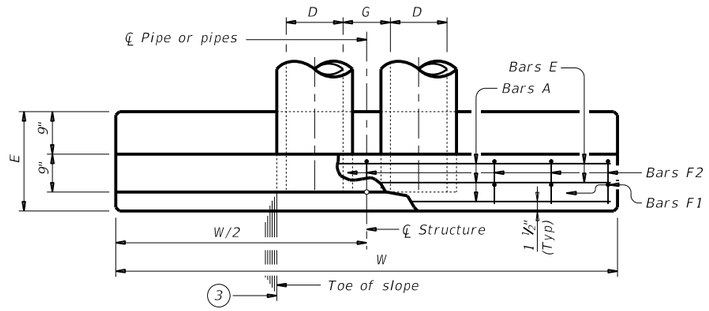
DATE: 1/27/2023 2:13:39 PM
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TABLE OF VARIABLE DIMENSIONS AND QUANTITIES FOR ONE HEADWALL (5)

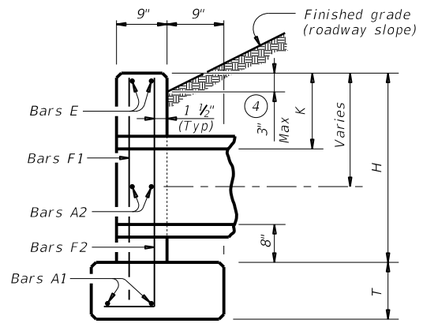
Slope	Dia of Pipe (D)	Values for One Pipe			Values To Be Added for Each Addt'l Pipe		
		W	Reinf (Lbs) (1)	Conc (CY) (2)	W	Reinf (Lbs) (1)	Conc (CY) (2)
2:1	12"	9' – 0"	122	1.1	1' – 9"	15	0.2
	15"	10' – 3"	136	1.3	2' – 2"	16	0.2
	18"	11' – 6"	163	1.5	2' – 8"	19	0.3
	21"	12' – 9"	200	1.8	3' – 1"	31	0.4
	24"	14' – 0"	217	2.1	3' – 7"	34	0.4
	27"	15' – 3"	254	2.4	3' – 11"	37	0.5
	30"	16' – 6"	272	2.7	4' – 4"	40	0.6
	33"	17' – 9"	314	3.1	4' – 8"	43	0.6
	36"	19' – 0"	371	3.9	5' – 1"	46	0.8
	42"	21' – 6"	442	4.9	5' – 10"	52	1.0
	48"	25' – 0"	569	6.4	6' – 7"	59	1.3
	54"	27' – 6"	701	7.5	7' – 6"	82	1.6
	60"	30' – 0"	794	8.8	8' – 3"	90	1.8
	66"	32' – 6"	894	10.2	8' – 9"	96	2.0
	72"	35' – 0"	1,055	11.7	9' – 4"	103	2.3
3:1	12"	13' – 0"	175	1.6	1' – 9"	14	0.2
	15"	14' – 9"	193	1.9	2' – 2"	17	0.2
	18"	16' – 6"	228	2.2	2' – 8"	19	0.3
	21"	18' – 3"	299	2.6	3' – 1"	31	0.4
	24"	20' – 0"	323	3.0	3' – 7"	33	0.4
	27"	21' – 9"	371	3.5	3' – 11"	37	0.5
	30"	23' – 6"	415	4.0	4' – 4"	40	0.5
	33"	25' – 3"	469	4.6	4' – 8"	43	0.6
	36"	27' – 0"	556	5.7	5' – 1"	46	0.8
	42"	30' – 6"	675	7.1	5' – 10"	52	1.0
	48"	35' – 6"	837	9.2	6' – 7"	59	1.3
	54"	39' – 0"	1,015	11.0	7' – 6"	84	1.6
	60"	42' – 6"	1,171	12.9	8' – 3"	91	1.8
	66"	46' – 0"	1,298	14.9	8' – 9"	98	2.0
	72"	49' – 6"	1,561	17.1	9' – 4"	103	2.3
4:1	12"	17' – 0"	229	2.0	1' – 9"	15	0.2
	15"	19' – 3"	266	2.4	2' – 2"	17	0.2
	18"	21' – 6"	308	2.9	2' – 8"	19	0.3
	21"	23' – 9"	382	3.5	3' – 1"	31	0.3
	24"	26' – 0"	430	3.9	3' – 7"	34	0.4
	27"	28' – 3"	486	4.7	3' – 11"	37	0.5
	30"	30' – 6"	539	5.2	4' – 4"	40	0.6
	33"	32' – 9"	603	6.0	4' – 8"	42	0.6
	36"	35' – 0"	738	7.5	5' – 1"	47	0.8
	42"	39' – 6"	881	9.3	5' – 10"	52	1.0
	48"	46' – 0"	1,102	12.1	6' – 7"	61	1.3
	54"	50' – 6"	1,364	14.4	7' – 6"	84	1.6
	60"	55' – 0"	1,547	16.9	8' – 3"	91	1.8
	66"	59' – 6"	1,741	19.5	8' – 9"	98	2.0
	72"	64' – 0"	2,077	22.4	9' – 4"	102	2.3
6:1	12"	25' – 0"	336	3.0	1' – 9"	14	0.2
	15"	28' – 3"	384	3.6	2' – 2"	17	0.2
	18"	31' – 6"	452	4.2	2' – 8"	19	0.3
	21"	34' – 9"	581	5.1	3' – 1"	31	0.4
	24"	38' – 0"	644	5.8	3' – 7"	34	0.4
	27"	41' – 3"	737	6.9	3' – 11"	37	0.5
	30"	44' – 6"	807	7.7	4' – 4"	39	0.6
	33"	47' – 9"	912	8.9	4' – 8"	44	0.6
	36"	51' – 0"	1,108	11.0	5' – 1"	48	0.8
	42"	57' – 6"	1,318	13.7	5' – 10"	54	1.0
	48"	67' – 0"	1,682	17.9	6' – 7"	59	1.3
	54"	73' – 6"	2,072	21.3	7' – 6"	83	1.6
	60"	80' – 0"	2,351	24.9	8' – 3"	89	1.8
	66"	86' – 6"	2,643	28.9	8' – 9"	96	2.0
	72"	93' – 0"	3,121	33.1	9' – 4"	101	2.3



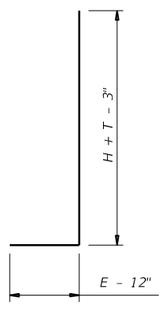
ELEVATION



PLAN OF NON-SKEWED PIPES



SECTION AT CENTER OF PIPE



BARS F2

(1) Total quantities include one 3'-1" lap for bars over 60' in length.

(2) Quantities shown are for concrete pipe and will increase slightly for metal pipe installations.

(3) Indicated slope is perpendicular to centerline pipe or pipes.

(4) For vehicle safety, construct curbs no more than 3" above finished grade. Reduce curb heights, if necessary, to meet these requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

(5) Dimensions shown are usual and maximum.

(6) Quantities shown are for one structure end only (one headwall).

TABLE OF CONSTANT DIMENSIONS

Dia of Pipe (D)	G	K (5)	H	T	E
12"	0' – 9"	1' – 0"	2' – 8"	0' – 9"	1' – 9"
15"	0' – 11"	1' – 0"	2' – 11"	0' – 9"	1' – 9"
18"	1' – 2"	1' – 0"	3' – 2"	0' – 9"	1' – 9"
21"	1' – 4"	1' – 0"	3' – 5"	0' – 9"	2' – 0"
24"	1' – 7"	1' – 0"	3' – 8"	0' – 9"	2' – 0"
27"	1' – 8"	1' – 0"	3' – 11"	0' – 9"	2' – 3"
30"	1' – 10"	1' – 0"	4' – 2"	0' – 9"	2' – 3"
33"	1' – 11"	1' – 0"	4' – 5"	0' – 9"	2' – 6"
36"	2' – 1"	1' – 0"	4' – 8"	1' – 0"	2' – 6"
42"	2' – 4"	1' – 0"	5' – 2"	1' – 0"	2' – 9"
48"	2' – 7"	1' – 3"	5' – 11"	1' – 0"	3' – 0"
54"	3' – 0"	1' – 3"	6' – 5"	1' – 0"	3' – 3"
60"	3' – 3"	1' – 3"	6' – 11"	1' – 0"	3' – 6"
66"	3' – 3"	1' – 3"	7' – 5"	1' – 0"	3' – 9"
72"	3' – 4"	1' – 3"	7' – 11"	1' – 0"	4' – 0"

TABLE OF REINFORCING STEEL (6)

Bar	Size	Spa	No.
A1	#5	~	2
A2	#5	1' – 6"	~
E	#5	~	2
F	#5	1' – 0"	~

MATERIAL NOTES:
Provide Grade 60 reinforcing steel.
Provide Class C concrete (f'c = 3,600 psi).

GENERAL NOTES:
Designed according to AASHTO LRFD Bridge Design Specifications.
Do not mount bridge rails of any type directly to these culvert headwalls.
This standard may not be used for wall heights, H, exceeding the values shown.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing dimensions are out-to-out of bars.

DISCLAIMER:
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Texas Department of Transportation

Bridge Division Standard

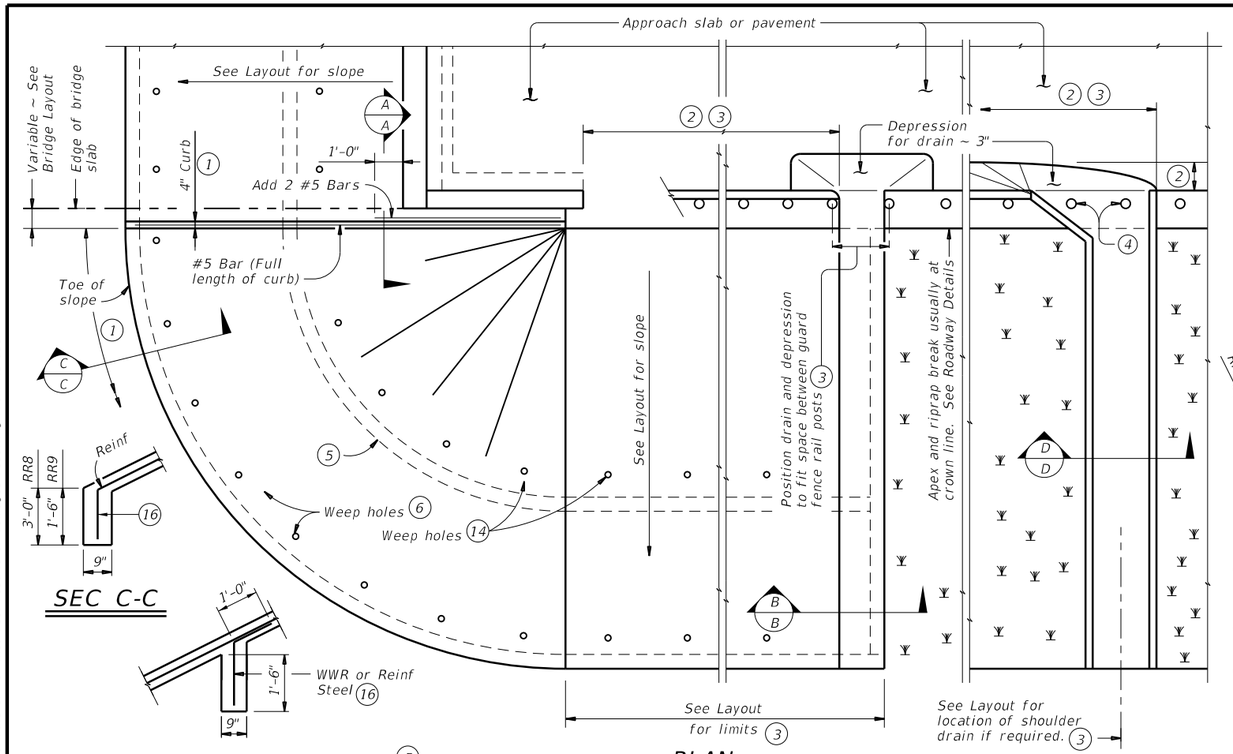
CONCRETE HEADWALLS WITH PARALLEL WINGS FOR NON-SKEWED PIPE CULVERTS

CH-PW-0

FILE: chpw0ste-20.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		197

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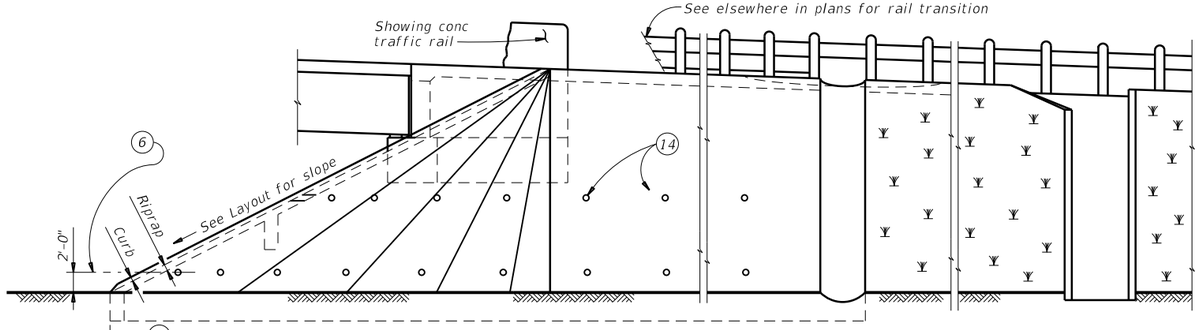
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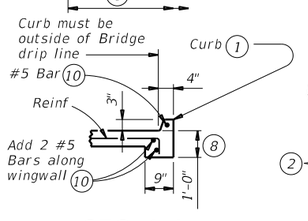
PLAN

SEC C-C

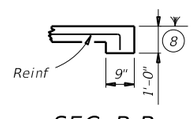
INTERMEDIATE TOEWALL (5)



ELEVATION

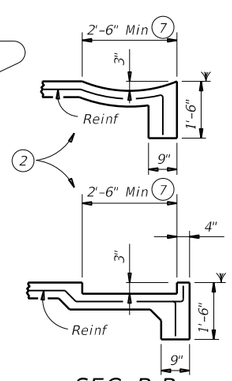


SEC A-A



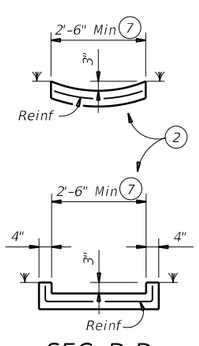
SEC B-B

(No drain)



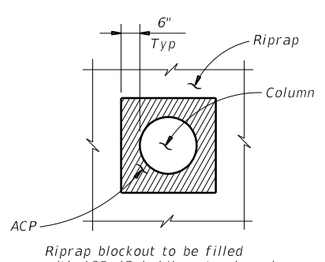
SEC B-B

(Shoulder drain integral with riprap)



SEC D-D

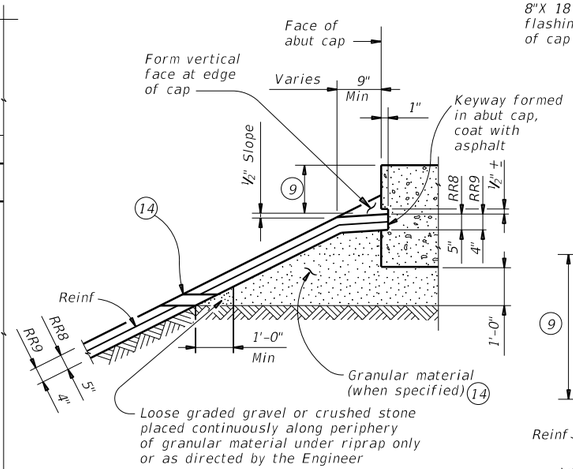
(Shoulder drain)



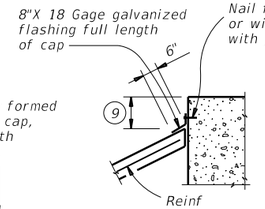
Riprap blockout to be filled with ACP. (Subsidiary to riprap)

RIPRAP DETAIL AT COLUMNS

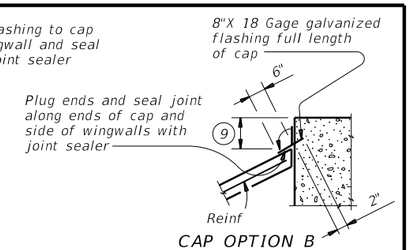
(As directed by the Engineer)



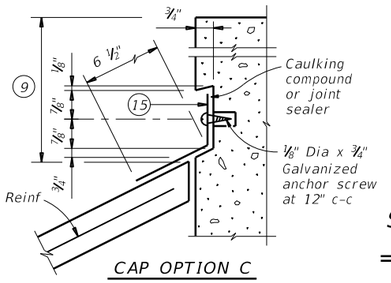
SHOWING KEYWAY OPTION



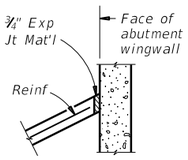
CAP OPTION A



CAP OPTION B

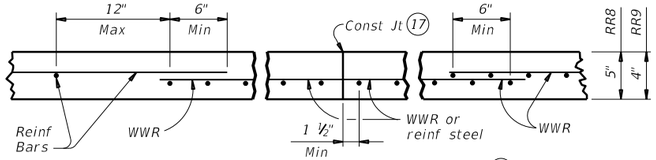


CAP OPTION C



SECT THRU RIPRAP AT WINGWALL (12)

SECTIONS THRU RIPRAP AT CAP (11)



REINFORCEMENT DETAILS (13)

See General Notes for optional synthetic fiber reinforcement.

1. When riprap is shown extended around header on layout, extend slab and toewall as shown and eliminate 4" curb.
2. Limits and configuration of drains and depressions are as shown elsewhere in plans or as directed by the Engineer.
3. Location of shoulder drain must consider limitations imposed by rail transition. Do not locate shoulder drains at expansion joints between approach slab and concrete pavement.
4. See details elsewhere in plans for installation of guard fence posts through concrete riprap.
5. Provide intermediate toewall only when designated elsewhere in the plans or included in the specifications.
6. Provide lower level of 2" Dia weep holes at 10' c-c backed by 1 CF packet of gravel and galvanized hardware cloth at all locations unless directed by the Engineer to eliminate.
7. Use wider or other drain configurations if shown elsewhere in plans or if directed by the Engineer.
8. Wall extension may be reduced or modified if approved by the Engineer. Increase wall extension to 1'-6" whenever the optional intermediate toewall is called for in the plans.
9. Top of cap to top of riprap dimension varies as directed by the Engineer. Should be 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.
10. #5 bars shown are required even when synthetic fiber reinforcing option is selected.
11. Provide sealing option for joint between the face of cap and riprap as designated by the Engineer or as shown elsewhere on plans.
12. Flashing (shown in Cap Option A) may be used at wingwall in addition to Exp Jt Mat'l if shown on plans or directed by the Engineer.
13. Provide #3 reinforcing bars at 18" Spa c-c. Provide Welded Wire Reinforcement (WWR) as 6x6-D2.9xD2.9 or D3xD3. Combinations of WWR and reinforcing bars may be used if both are permitted. Use lap splices of a minimum 6 inches, measured from the transverse wire of WWR, and the ends of reinforcing bars.
14. If granular material is specified, provide upper level of 2" Dia weep holes at 10' c-c backed by galvanized hardware cloth.
15. 8" x 18 Gage Galv Sheet Metal
16. Provide WWR or #3 bars, with 1'-0" extension into slope.
17. WWR or reinforcing steel is continuous through riprap construction joints. Provide WWR or reinforcing steel that extends 1'-1" minimum into adjacent riprap on each side of construction joint even if synthetic reinforcing fiber is utilized.

FOR CONTRACTOR'S INFORMATION ONLY:
5" of RR8 = 0.015 CY/SF
4" of RR9 = 0.012 CY/SF
#3 Reinf at 18" c-c = 0.501 Lbs/SF
6x6-D3xD3 = 0.408 Lbs/SF

GENERAL NOTES:

Provide Class "B" concrete (f'c = 2,000 psi) unless noted elsewhere in plans.

Provide Grade 60 reinforcing steel.

Provide deformed welded wire reinforcement (WWR) meeting ASTM A1064, unless otherwise shown.

Provide reinforcing bars, deformed WWR, or any suitable combination of both types for riprap reinforcing, unless specified elsewhere in the plans.

Optionally synthetic fibers may be used if approved by the Engineer. Provide synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) in lieu of steel reinforcing in riprap concrete.

Install construction joints or grooved joints extending the full slant slope height at intervals of approximately 20 feet unless otherwise directed by the Engineer.

Hardware cloth, loose grade stone behind weep holes, flashing, or other sealing material are subsidiary to the bid item "Riprap".

See Layout for limits of riprap.

RR8 is to be used on stream crossings.

RR9 is to be used on other embankments.

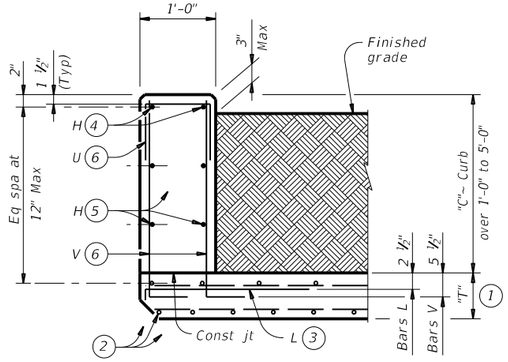
Texas Department of Transportation

Bridge Division Standard

CONCRETE RIPRAP AND SHOULDER DRAINS
EMBANKMENTS AT BRIDGE ENDS (TYPES RR8 & RR9)

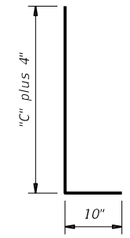
CRR

FILE: crrstde1-19.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		198



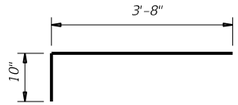
TYPICAL SECTION

Used for curbs over 1'–0" to 5'–0"



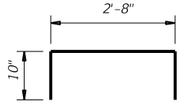
BARS V (#5) (6)

Spaced at 12" Max



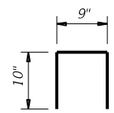
BARS L (#5) (3)

Spaced at 12" Max



OPTIONAL BARS L (#5) (3) (7)

Spaced at 12" Max



BARS U (#4) (6)

Spaced at 12" Max

(1) "T" is equal to the culvert top slab thickness. For precast boxes with slabs less than 8" thick, see SCP-MD standard for additional details.

(2) Adjust normal culvert slab bars as necessary to clear obstructions.

(3) Place bars L as shown. Tilt hook as necessary to maintain cover.

(4) Place normal culvert curb bars H(#4) as shown. Adjust as necessary to clear obstructions.

(5) Additional bars H(#4) as required to maintain 12" Max spacing.

(6) Replace normal culvert curb bars K with one bar U and two bars V as shown spaced at 12" Max. Adjust length of bars V as necessary to maintain clear cover.

(7) Optional bars L are to be used only for precast box culverts with 3'–0" closure pour.

(8) Quantities shown are for Contractor's information only. Quantities are per linear foot of curb length. The value in table can be interpolated for intermediate values of curb height, "C". Quantity includes bars K (when applicable).

TABLE OF ESTIMATED CURB QUANTITIES (8)

Curb Height "C"	Conc (CY/LF)	Reinf Steel (Lb/LF)
1'–0"	0.037	10.4
1'–6"	0.056	14.5
2'–0"	0.074	15.6
2'–6"	0.093	18.0
3'–0"	0.111	19.0
3'–6"	0.130	21.3
4'–0"	0.148	22.4
4'–6"	0.167	24.8
5'–0"	0.185	25.9

CONSTRUCTION NOTES:

Adjust reinforcing steel as necessary to provide 1 ¼" cover.

For vehicle safety, top of the curb must not project more than 3" above the finished grade.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.

Provide galvanized reinforcing steel if required elsewhere in the plans.

Provide Class "C" concrete (f'_c = 3,600 psi) minimum for curbs.

Provide bar laps, where required, as follows:

- Uncoated or galvanized ~ #4 = 1'–8" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.

These extended curb details have sufficient strength to allow for future retrofit of Type T631 or T631LS railing. These details are suitable for use with PR11, PR22 and PR3 type rails. These details are not suitable for the mounting of other rail types. For new construction using T631 or T631LS railing, use the T631-CM standard.

This Curb is considered as part of the Box Culvert for payment.

Cover dimensions are clear dimensions, unless noted otherwise.

Reinforcing bar dimensions shown are out-to-out of bar.

Texas Department of Transportation

Bridge Division Standard

EXTENDED CURB DETAILS

FOR BOX CULVERTS WITH CURBS OVER 1'-0" TO 5'-0" TALL

ECD

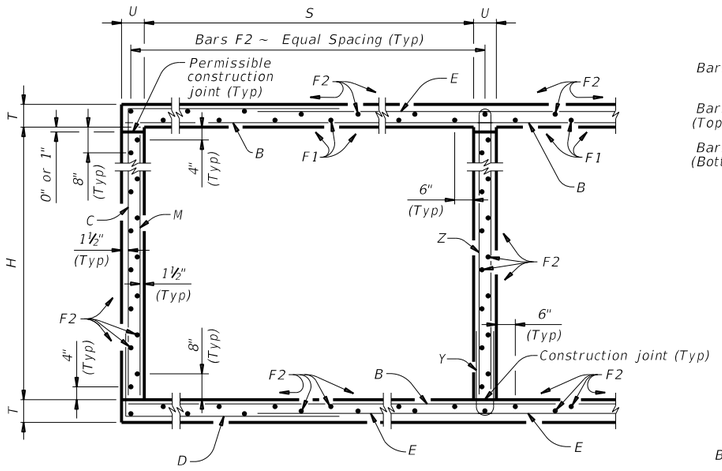
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		199

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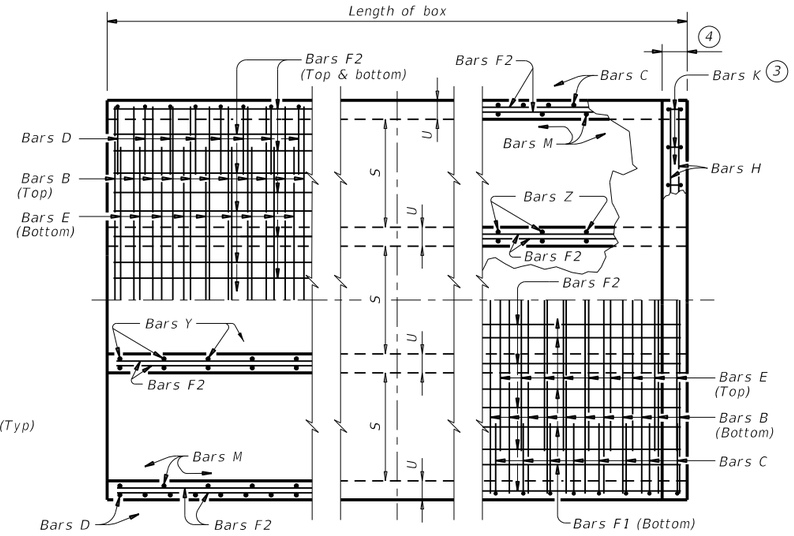
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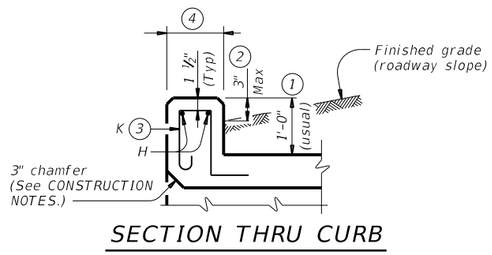


TYPICAL SECTION



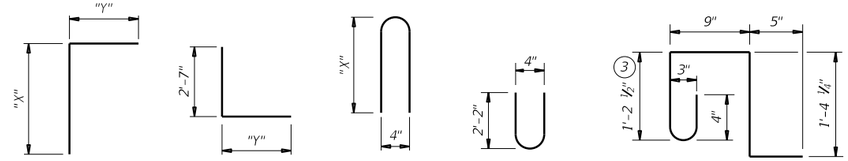
BOTTOM SLAB TOP SLAB

PART PLANS



SECTION THRU CURB

TABLE OF BAR DIMENSIONS		
H	"X"	"Y"
3'-0"	3'-6 ½"	4'-5"
4'-0"	4'-6 ½"	4'-5"
5'-0"	5'-6 ½"	4'-5"
6'-0"	6'-6 ½"	4'-5"
7'-0"	7'-6 ½"	4'-5"



BARS C BARS D BARS Z BARS Y BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0", refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Rail Anchorage Curb (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.

2. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.

3. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.

4. 1'-0" typical. 2'-3" when the Rail Anchorage Curb (RAC) standard sheet is referred to elsewhere in the plans.

The Contractor may replace Bars B, C, D, E, F1, F2, M, Y, and/or Z with deformed welded wire reinforcement (WWR) meeting the requirements of ASTM A1064. The area of required reinforcement may be reduced by the ratio of 60 ksi / 70 ksi. Spacing of WWR is limited to 4" Min and 18" Max. When required, provide lap splices in the WWR of the same length required for the equivalent bar size, rounded up for wire sizes between conventional bar sizes. The lap length required for WWR is never less than the lap length required for uncoated #4 bars.

Example conversion: Replacing No. 6 Gr 60 at 6" Spacing with WWR
Required WWR = (0.44 sq. in. per 0.5 ft.) x (60 ksi / 70 ksi) = 0.755 sq. in. per ft.
If D30.6 wire is used to meet the 0.755 sq. in. per ft. requirement in this example, the required spacing = (0.306 sq. in.) / (0.755 sq. in. per ft.) x (12 in. per ft.) = 4.86" Max spacing. Required lap length for the provided D30.6 wire is 2'-1" (the same minimum lap length required for uncoated #5 bars, as listed under MATERIAL NOTES).

CONSTRUCTION NOTES:

Do not use permanent forms.
Chamfer the bottom edge of the top slab 3" at the entrance.
Optionally, raise construction joints shown at the flow line by a maximum of 6". If this option is taken, Bars M may be cut off or raised, Bars C and D may be reversed, and Bars Y and Z may be reversed.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) for culvert barrel and curb, with the following exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of:
- culverts with overlay,
- culverts with 1-to-2 course surface treatment, or
- culverts with the top slab as the final riding surface.

Provide bar laps, where required, as follows:
- Uncoated or galvanized ~ #4 = 1'-8" Min
- Uncoated or galvanized ~ #5 = 2'-1" Min
- Uncoated or galvanized ~ #6 = 2'-6" Min

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications for the range of fill heights shown.
See the Multiple Box Culverts Cast-In-Place Miscellaneous Detail (MC-MD) standard sheet for details pertaining to skewed ends, angle sections, and lengthening.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bar dimensions shown are out-to-out of bar.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation — Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE 7'-0" SPAN 0' TO 10' FILL

MC-7-10

FILE: mc710ste-20.dgn	DN: TBE	CK: BMP	DW: TxDOT	CK: TxDOT
©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		200

NUMBER OF SPANS	SECTION DIMENSIONS				BILLS OF REINFORCING STEEL (For Box Length = 40 feet)																														QUANTITIES					
					Bars B					Bars C & D							Bars E					Bars F1 ~ #4				Bars F2 ~ #4				Bars M ~ #4				Bars Y & Z ~ #4							Bars H 4 ~ #4		Bars K		Per Foot of Barrel		Curb		Total	
												Bars C		Bars D																				Bars Y		Bars Z											
	S	H	T	U	No.	Size	Spa	Length	Wt	No.	Size	Spa	Length	Wt	Length	Wt	No.	Size	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	No.	Spa	Length	Wt	Length	Wt	No.	Wt	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)	Conc (CY)	Renf (Lb)
2	7' – 0"	3' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	3' – 0"	216	54	9"	4' – 7"	165	7' – 3"	262	15' – 6"	41	34	95	0.972	230.8	1.2	136	40.0	9,366
3	7' – 0"	3' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	3' – 0"	216	108	9"	4' – 7"	331	7' – 3"	523	23' – 1"	62	50	139	1.412	321.5	1.7	201	58.2	13,061
4	7' – 0"	3' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	3' – 0"	216	162	9"	4' – 7"	496	7' – 3"	785	30' – 8"	82	64	178	1.851	412.3	2.3	260	76.3	16,751
5	7' – 0"	3' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	3' – 0"	216	216	9"	4' – 7"	661	7' – 3"	1,046	38' – 3"	102	80	223	2.290	503.0	2.8	325	94.4	20,446
6	7' – 0"	3' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	7' – 11"	1,338	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	3' – 0"	216	270	9"	4' – 7"	827	7' – 3"	1,308	45' – 10"	122	94	262	2.729	593.9	3.4	384	112.6	24,138
2	7' – 0"	4' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	54	18"	39' – 9"	1,434	108	9"	4' – 0"	289	54	9"	4' – 7"	165	9' – 3"	334	15' – 6"	41	34	95	1.037	238.6	1.2	136	42.6	9,680
3	7' – 0"	4' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	77	18"	39' – 9"	2,045	108	9"	4' – 0"	289	108	9"	4' – 7"	331	9' – 3"	667	23' – 1"	62	50	139	1.498	331.2	1.7	201	61.6	13,447
4	7' – 0"	4' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	100	18"	39' – 9"	2,655	108	9"	4' – 0"	289	162	9"	4' – 7"	496	9' – 3"	1,001	30' – 8"	82	64	178	1.959	423.7	2.3	260	80.6	17,209
5	7' – 0"	4' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	123	18"	39' – 9"	3,266	108	9"	4' – 0"	289	216	9"	4' – 7"	661	9' – 3"	1,335	38' – 3"	102	80	223	2.420	516.3	2.8	325	99.6	20,977
6	7' – 0"	4' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	8' – 11"	1,507	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	146	18"	39' – 9"	3,877	108	9"	4' – 0"	289	270	9"	4' – 7"	827	9' – 3"	1,668	45' – 10"	122	94	262	2.881	608.9	3.4	384	118.6	24,740
2	7' – 0"	5' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	60	18"	39' – 9"	1,593	108	9"	5' – 0"	361	54	9"	4' – 7"	165	11' – 3"	406	15' – 6"	41	34	95	1.102	250.4	1.2	136	45.2	10,152
3	7' – 0"	5' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	85	18"	39' – 9"	2,257	108	9"	5' – 0"	361	108	9"	4' – 7"	331	11' – 3"	812	23' – 1"	62	50	139	1.584	346.1	1.7	201	65.1	14,045
4	7' – 0"	5' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	110	18"	39' – 9"	2,921	108	9"	5' – 0"	361	162	9"	4' – 7"	496	11' – 3"	1,217	30' – 8"	82	64	178	2.067	441.8	2.3	260	85.0	17,932
5	7' – 0"	5' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	135	18"	39' – 9"	3,585	108	9"	5' – 0"	361	216	9"	4' – 7"	661	11' – 3"	1,623	38' – 3"	102	80	223	2.549	537.5	2.8	325	104.8	21,825
6	7' – 0"	5' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	9' – 11"	1,676	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	160	18"	39' – 9"	4,248	108	9"	5' – 0"	361	270	9"	4' – 7"	827	11' – 3"	2,029	45' – 10"	122	94	262	3.032	633.2	3.4	384	124.7	25,713
2	7' – 0"	6' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	6' – 0"	433	54	9"	4' – 7"	165	13' – 3"	478	15' – 6"	41	34	95	1.167	262.2	1.2	136	47.8	10,624
3	7' – 0"	6' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	6' – 0"	433	108	9"	4' – 7"	331	13' – 3"	956	23' – 1"	62	50	139	1.671	361.0	1.7	201	68.6	14,642
4	7' – 0"	6' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	6' – 0"	433	162	9"	4' – 7"	496	13' – 3"	1,434	30' – 8"	82	64	178	2.175	459.9	2.3	260	89.3	18,655
5	7' – 0"	6' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	6' – 0"	433	216	9"	4' – 7"	661	13' – 3"	1,912	38' – 3"	102	80	223	2.679	558.7	2.8	325	110.0	22,673
6	7' – 0"	6' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	10' – 11"	1,845	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	6' – 0"	433	270	9"	4' – 7"	827	13' – 3"	2,390	45' – 10"	122	94	262	3.183	657.6	3.4	384	130.7	26,687
2	7' – 0"	7' – 0"	8"	7"	108	#6	9"	15' – 6"	2,514	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	11' – 5"	1,852	10	18"	39' – 9"	266	66	18"	39' – 9"	1,752	108	9"	7' – 0"	505	54	9"	4' – 7"	165	15' – 3"	550	15' – 6"	41	34	95	1.231	270.0	1.2	136	50.4	10,937
3	7' – 0"	7' – 0"	8"	7"	108	#6	9"	23' – 1"	3,744	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	19' – 0"	3,082	15	18"	39' – 9"	398	93	18"	39' – 9"	2,469	108	9"	7' – 0"	505	108	9"	4' – 7"	331	15' – 3"	1,100	23' – 1"	62	50	139	1.757	370.7	1.7	201	72.0	15,027
4	7' – 0"	7' – 0"	8"	7"	108	#6	9"	30' – 8"	4,975	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	26' – 7"	4,312	20	18"	39' – 9"	531	120	18"	39' – 9"	3,186	108	9"	7' – 0"	505	162	9"	4' – 7"	496	15' – 3"	1,650	30' – 8"	82	64	178	2.283	471.3	2.3	260	93.6	19,112
5	7' – 0"	7' – 0"	8"	7"	108	#6	9"	38' – 3"	6,205	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	34' – 2"	5,542	25	18"	39' – 9"	664	147	18"	39' – 9"	3,903	108	9"	7' – 0"	505	216	9"	4' – 7"	661	15' – 3"	2,200	38' – 3"	102	80	223	2.809	571.9	2.8	325	115.2	23,202
6	7' – 0"	7' – 0"	8"	7"	108	#6	9"	45' – 10"	7,435	162	#5	6"	11' – 11"	2,014	7' – 0"	1,183	108	#6	9"	41' – 9"	6,773	30	18"	39' – 9"	797	174	18"	39' – 9"	4,620	108	9"	7' – 0"	505	270	9"	4' – 7"	827	15' – 3"	2,750	45' – 10"	122	94	262	3.334	672.6	3.4	384	136.8	27,288

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HL93 LOADING SHEET 2 OF 2

Texas Department of Transportation

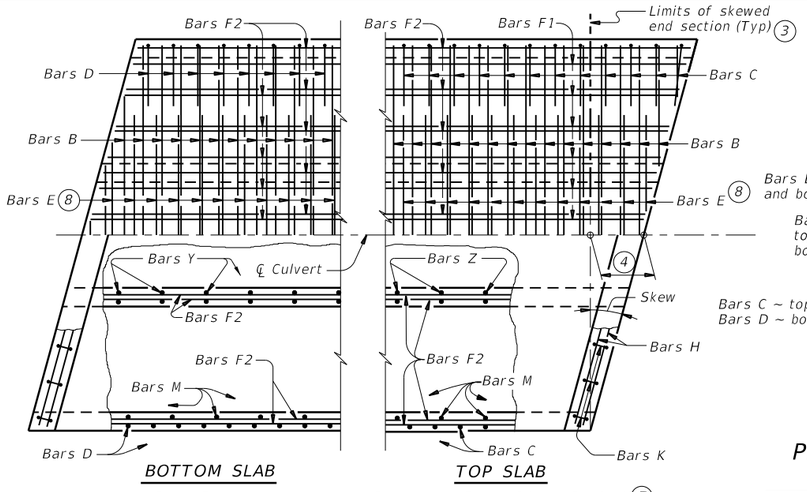
Bridge Division Standard

MULTIPLE BOX CULVERTS
CAST-IN-PLACE
7'-0" SPAN
0' TO 10' FILL

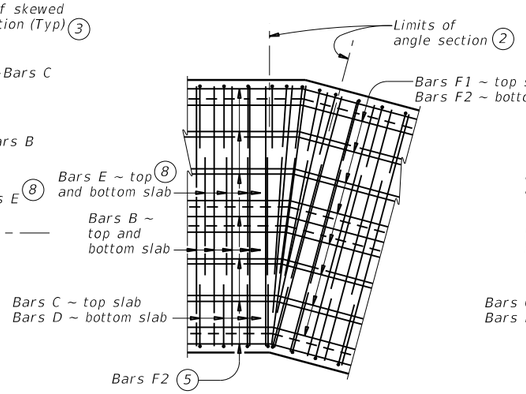
MC-7-10

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		201

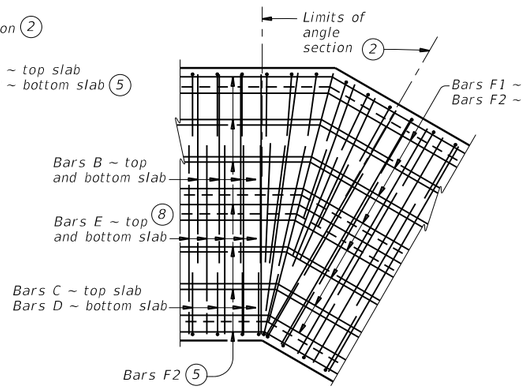
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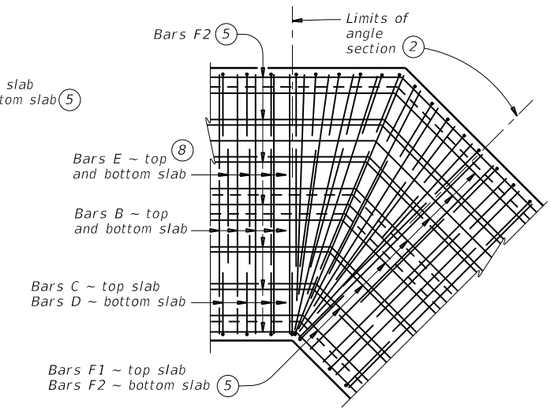
PLAN OF SKEWED ENDS ~ FROM 0° TO 15° 7



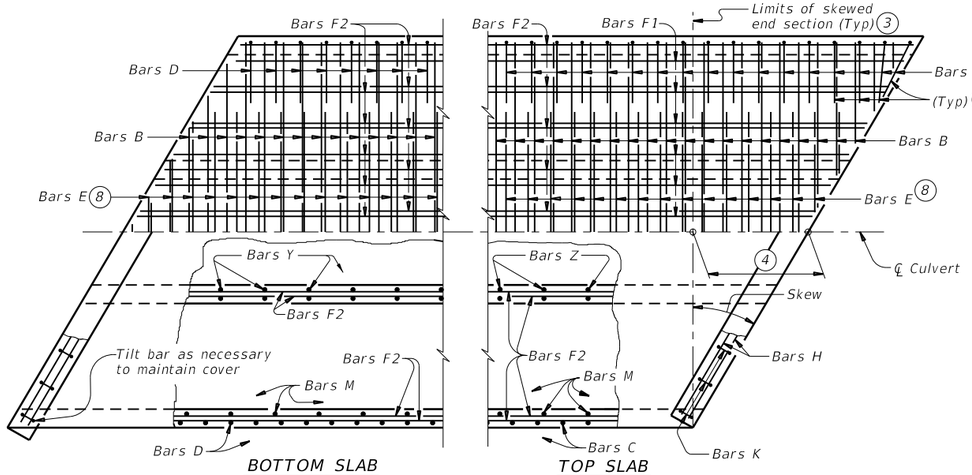
PLAN OF ANGLE SECTION ~ FROM 0° TO 15°



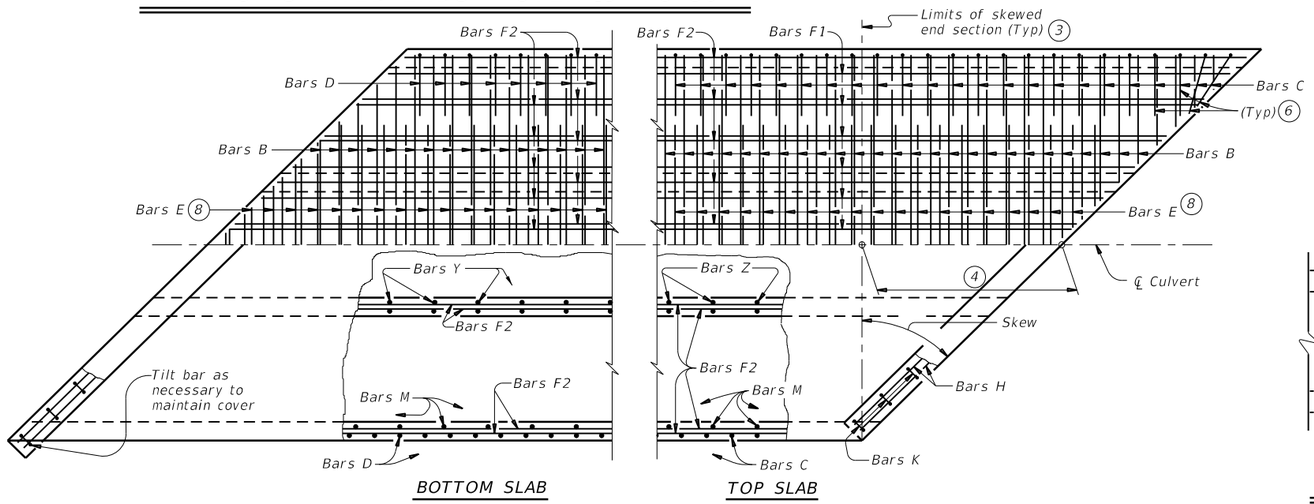
PLAN OF ANGLE SECTION ~ OVER 15° TO 30°



PLAN OF ANGLE SECTION ~ OVER 30° TO 45°



PLAN OF SKEWED ENDS ~ OVER 15° TO 30°



PLAN OF SKEWED ENDS ~ OVER 30° TO 45°

1 For skewed box culverts with less than 2'-0" of fill, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension.

For non-skewed box culverts with less than 2'-0" of fill and for skewed or non-skewed culverts with a fill depth of 2'-0" or greater, break back the top slab to provide a 1'-10" minimum lap of the existing longitudinal bars with the longitudinal bars in the extension. Alternatively, if the box is non-skewed, embed #6 anchor bars with a Type III, Class C, D, E, or F anchor adhesive into the existing walls, top and bottom slab at 1'-6" center-to-center spacing. Minimum embedment depth is 8". Anchor adhesive chosen must be able to achieve a basic bond strength in tension, Nba, of 26.4 kips. Submit signed and sealed calculations or the manufacturer's published literature showing the proposed anchor adhesive's ability to develop this load to the Engineer for approval prior to use. Anchor installation, including hole size, drilling, and clean out, must be in accordance with Item 450, "Railing." Test adhesive anchors in accordance with Item 450.3.3, "Tests." Test 3 anchors per 100 anchors installed.

Break back wings and apron as necessary to install the extension. Clean and extend the exposed wingwall and apron reinforcing into the extension. When lengthening existing box culverts with dimensions different than current standard dimensions, form horizontal and vertical transitions as directed by the Engineer. Match bottom slabs to maintain an uninterrupted flow line. Field bend existing and new reinforcing into transitions and maintain specified cover requirements. For top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface, adjust the "H" dimension to provide a smooth riding surface.

2 When the spacing between Bars B or Bars E becomes less than half of the normal spacing, cut bars to avoid conflict.

3 The length of Bars B and Bars E will vary in the skewed end sections.

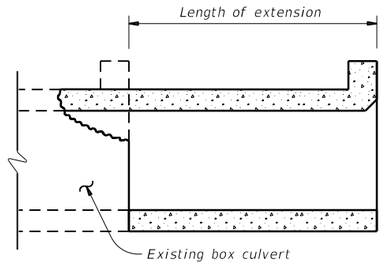
4 [One half of overall width] x [tangent of the skew angle]

5 Place Bars F1 and F2 continuously through the angle section. Bend Bars F1 and F2 to remain parallel to the walls of the box culvert.

6 When necessary to avoid conflict in acute corners, shorten the slab extension leg of Bars C and Bars D to a minimum of 1'-6" for skews of 30° thru 45°.

7 At the Contractor's option, for skews of 15° or less, place Bars B, C, D, and E parallel to the skewed end while maintaining spacing along centerline of box. Increase lengths of Bars B and Bars E shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets to accommodate the skew.

8 Extend Bars E as shown on the MC standard sheet for direct traffic culverts.



LENGTHENING DETAIL 1

CONSTRUCTION NOTES:

Do not use permanent forms.
When required, lap Bars H 1'-8" for uncoated or galvanized bars.
Provide a minimum of 1 ½" clear cover.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel, if required elsewhere in the plans.
Provide Class C concrete (f'c = 3,600 psi) with these exceptions: provide Class S concrete (f'c = 4,000 psi) for top slabs of culverts with overlay, with 1-to-2 course surface treatment, or with the top slab as the final riding surface.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for details of straight sections of culvert.
For skewed sections and angle sections, refer to Multiple Box Culverts Cast-in-Place (MC) standard sheets for slab and wall dimensions, bar sizes, maximum bar spacing, and any other details not shown.
For skewed ends with curbs, adjust length of Bars H, number of Bars K, curb concrete volume, and reinforcing steel weight by dividing the values shown on the Multiple Box Culverts Cast-In-Place (MC) standard sheets by the cosine of the skew angle.

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

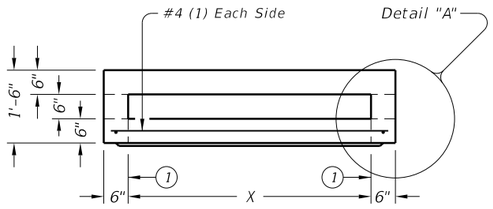
Bridge Division Standard

MULTIPLE BOX CULVERTS CAST-IN-PLACE MISCELLANEOUS DETAILS

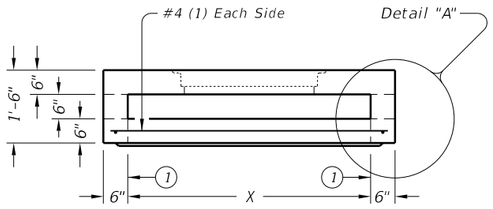
MC-MD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
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	AUS	HAYS		202

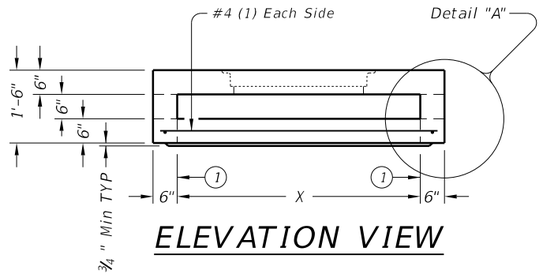
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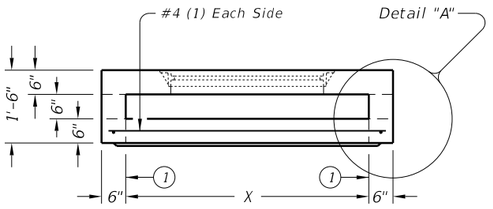
ELEVATION VIEW



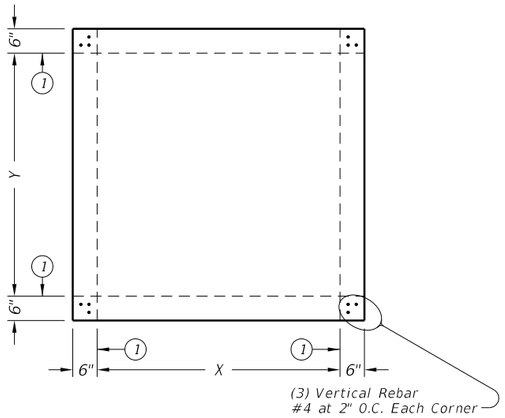
ELEVATION VIEW



ELEVATION VIEW



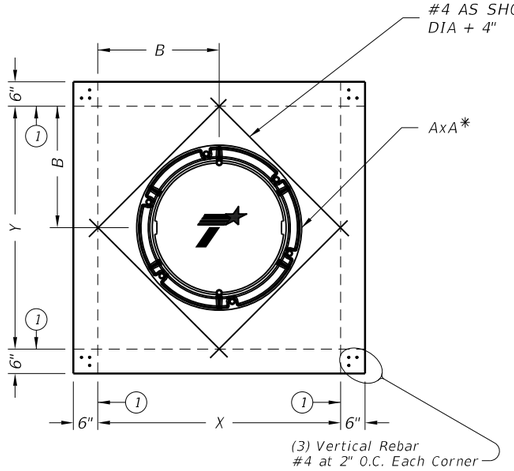
ELEVATION VIEW



PLAN VIEW

NO OPENINGS

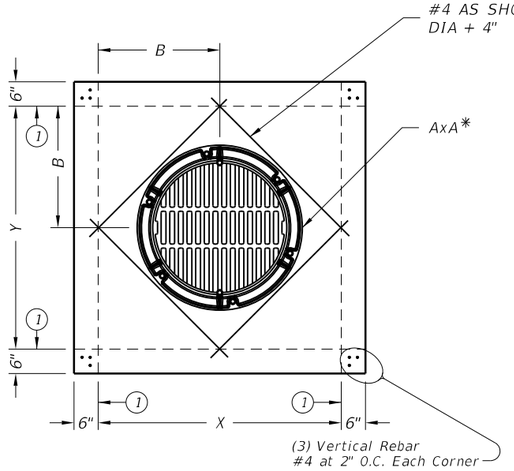
STYLE 'SL'



PLAN VIEW

32" DIA CAST-IN RING & COVER

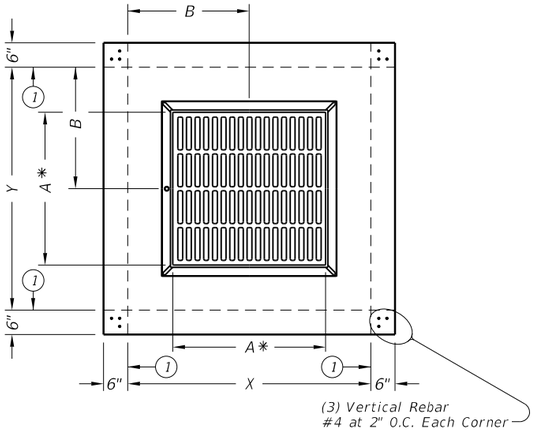
STYLE 'RC'



PLAN VIEW

32" DIA CAST-IN RING & GRATE

STYLE 'RG'



PLAN VIEW

CAST-IN FRAME & GRATE

STYLE 'FG'

(1) Matches inside face of wall of precast base or riser below inlet.

Style	Size (X x Y)	A x A *	B x B	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	n/a	n/a	0.37 in²/ft	0.37 in²/ft
RC,RG	3'x3'	32" Dia	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
FG	3'x3'	3'x3'	1.5'x1.5'	0.37 in²/ft	0.37 in²/ft
SL	4'x4'	n/a	n/a	0.34 in²/ft	0.34 in²/ft
RC,RG	4'x4'	32" Dia	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	3'x3'	2'x2'	0.34 in²/ft	0.34 in²/ft
FG	4'x4'	4'x4'	2'x2'	0.34 in²/ft	0.34 in²/ft
SL	5'x5'	n/a	n/a	0.43 in²/ft	0.43 in²/ft
RC,RG	5'x5'	32" Dia	2.5'x2.5'	0.68 in²/ft	0.68 in²/ft
FG	5'x5'	3'x3'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft
FG	5'x5'	4'x4'	2.5'x2.5'	0.43 in²/ft	0.43 in²/ft

* Nominal frame/grate or ring/cover size.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide clear cover of ¾" to reinforcing from bottom of slab for structural reinforcement. Place short span reinforcing closest to surface.
4. No substitution is allowed for diagonal #4 bars around openings.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
6. Provide lifting devices in conformance with Manufacturer's recommendations.

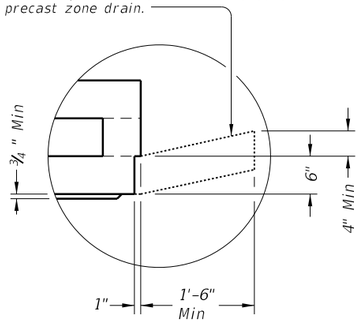
INSTALLATION NOTES:

1. PAZD is for use in ditches and medians outside of the horizontal clearance (clear zone). Precast Area Zone Drain is not intended for direct traffic and may not be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Construct cast-in-place reinforced concrete apron when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PAZD. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PAZD, use detail above to create an apron ledge on all 4 sides.

Texas Department of Transportation

Bridge Division Standard

PRECAST AREA ZONE DRAIN

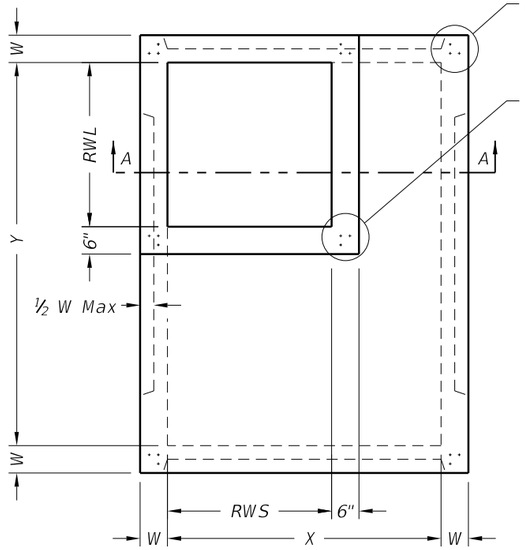
PAZD

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	AUS	HAYS		203

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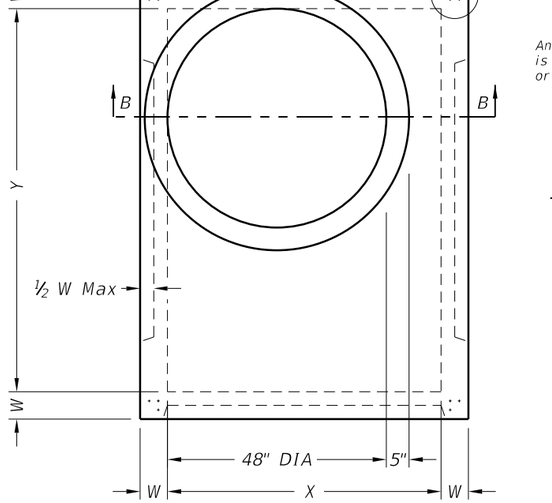
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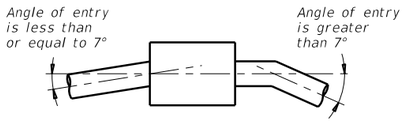
PLAN VIEW "A"

SQUARE REDUCED RISER OPTION



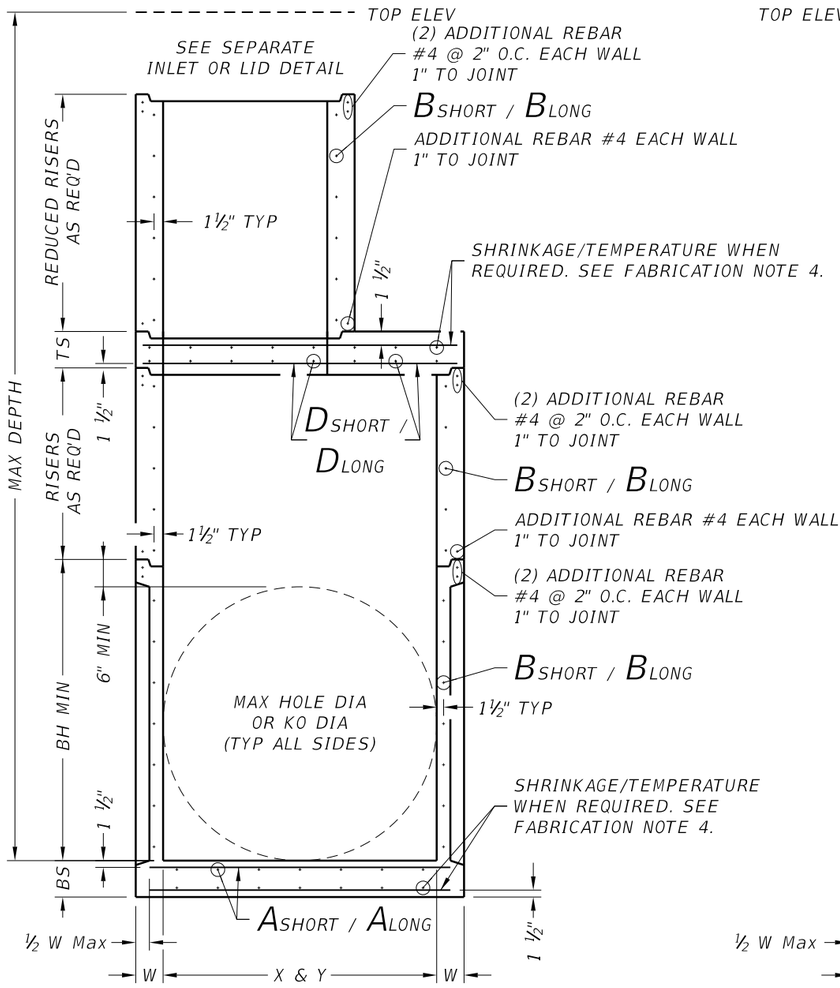
PLAN VIEW "B"

ROUND REDUCED RISER OPTION



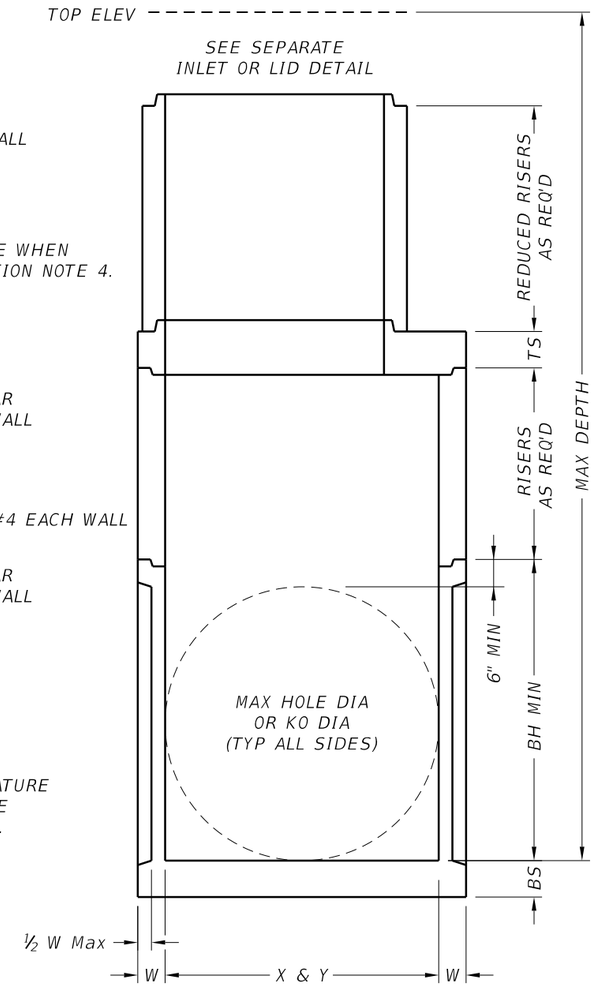
PIPE CONNECTION DETAIL

Connect pipes within 7° of normal to PB wall.
If necessary, use pipe elbow or curved
approach alignment to stay within this limit.



SECTION A-A

SQUARE REDUCED RISER OPTION



SECTION B-B

ROUND REDUCED RISER OPTION

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel at interior or exterior walls.
4. Walls or slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing steel. Provide steel area = 0.11 in²/ft each way.
5. No substitution is allowed for vertical and horizontal #4 bars in corners.
6. Manufacture base and risers to nearest 3" increment.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.
9. See sheet PDD for sizes, dimensions, and reinforcing steel not shown.

INSTALLATION NOTES:

1. If required elsewhere. Inverts (benching) to be provided by Contractor. Concrete or mortar used for invert is subsidiary to specified inlet or manhole.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. For rigid pipe, cut hole in thin wall panel (KO) 4" Max, 2" Min larger than pipe OD.
5. For flexible pipe, consult boot/seal Manufacturer's specification for placement tolerance and hole size. Center pipe in hole and install boot/seal per Manufacturer's specification.

GENERAL NOTES:

1. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PDD for sizes.
2. Designed according to ASTM C913.
3. Payment for precast base is subsidiary to the specified inlet, per Item 465, "Junction Boxes, Manholes, and Inlets."

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST BASE

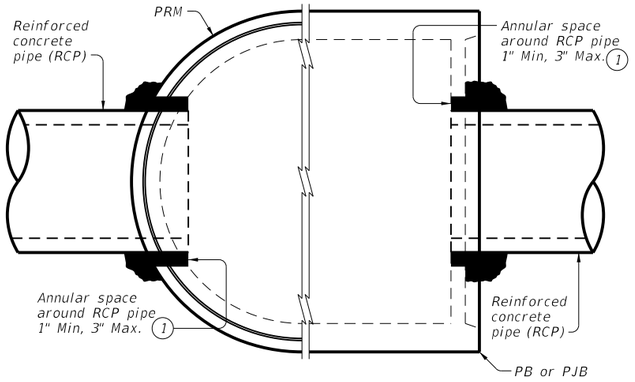
PB

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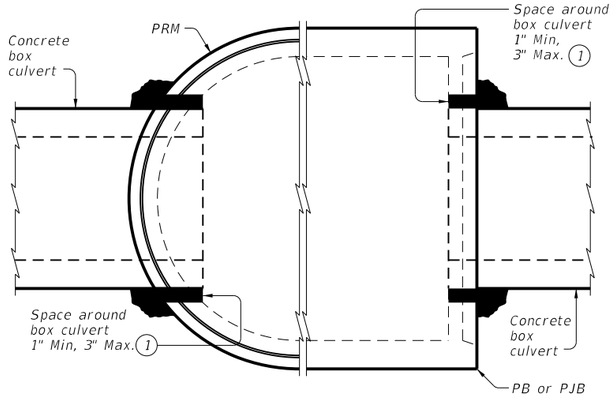
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PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

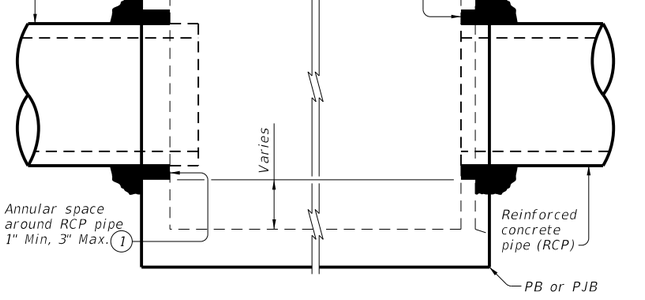
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

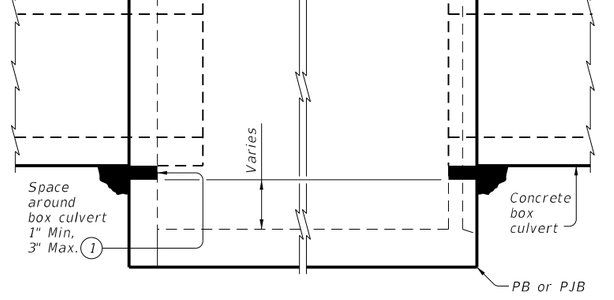
TYPICAL HALF PLAN



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

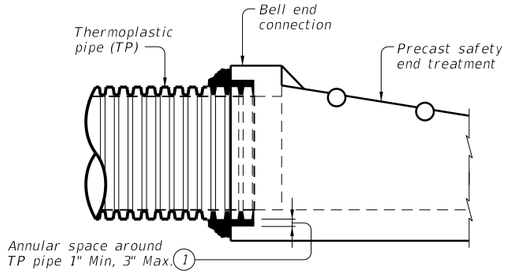
TYPICAL HALF ELEVATION



PRECAST ROUND MANHOLE (PRM) WITH THROUGH-HOLE

PRECAST BASE (PB) OR PRECAST JUNCTION BOX (PJB) WITH THIN-WALL KNOCK-OUT

TYPICAL HALF ELEVATION



TYPICAL PARTIAL ELEVATION OF PRECAST SAFETY END TREATMENTS

Showing square PSET for parallel drainage, cross drainage shown similar.

(1) Completely fill the void between the precast structure and the connecting pipe or box with cementitious grouts and mortars in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

CONSTRUCTION NOTES:

Do not grout rubber gasket joints without Manufacturer's recommendations.

Do not use bricks, masonry blocks, native stone, or similar materials in conjunction with grouted connections when filling void spaces around pipes or box culverts.

MATERIAL NOTES:

Provide grouted connections in accordance with DMS-4675 "Cementitious Grouts and Mortars for Miscellaneous Application".

GENERAL NOTES:

See applicable standards for notes and details not shown:
- Precast Base (PB)
- Precast Junction Box (PJB)
- Precast Round Manhole (PRM)
- Precast Safety End Treatments C/D Square (PSET-SC)
- Precast Safety End Treatments P/D Square (PSET-SP)

Provide Concrete Box Culverts in accordance with Item 462 "Concrete Box Culverts and Drains".

Provide Reinforced Concrete Pipe (RCP) in accordance with Item 464 "Reinforced Concrete Pipe".

Provide Thermoplastic Pipe (TP) in accordance with Special Specification Thermoplastic Pipe.

Payment for grouted connections is considered subsidiary to other bid Items.

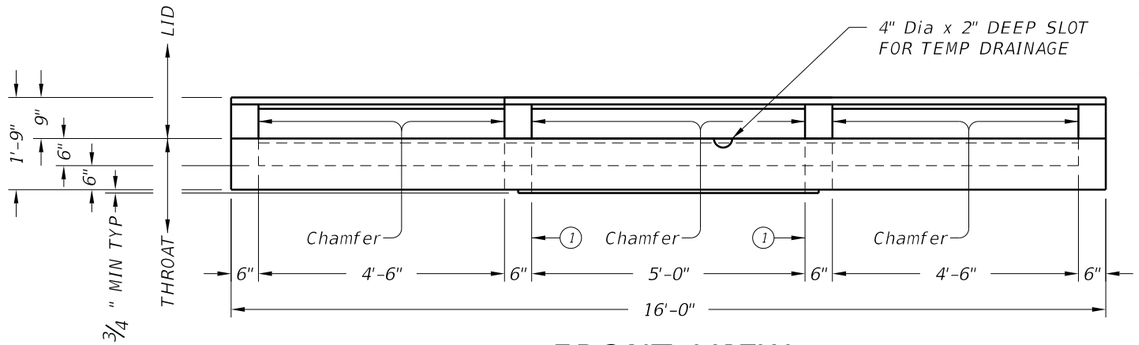
Texas Department of Transportation

Bridge Division Standard

PIPE AND BOX GROUTED CONNECTIONS FOR PRECAST STRUCTURES

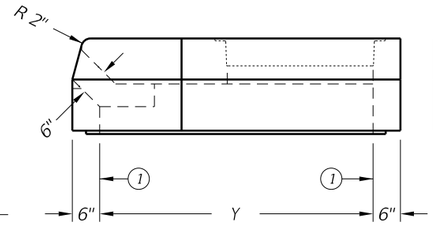
PBGC

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FRONT VIEW

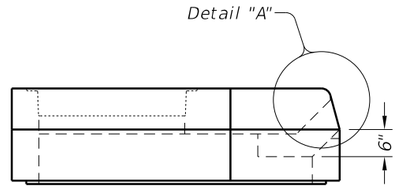
(SHOWING LEFT AND RIGHT EXTENSIONS)



RIGHT VIEW

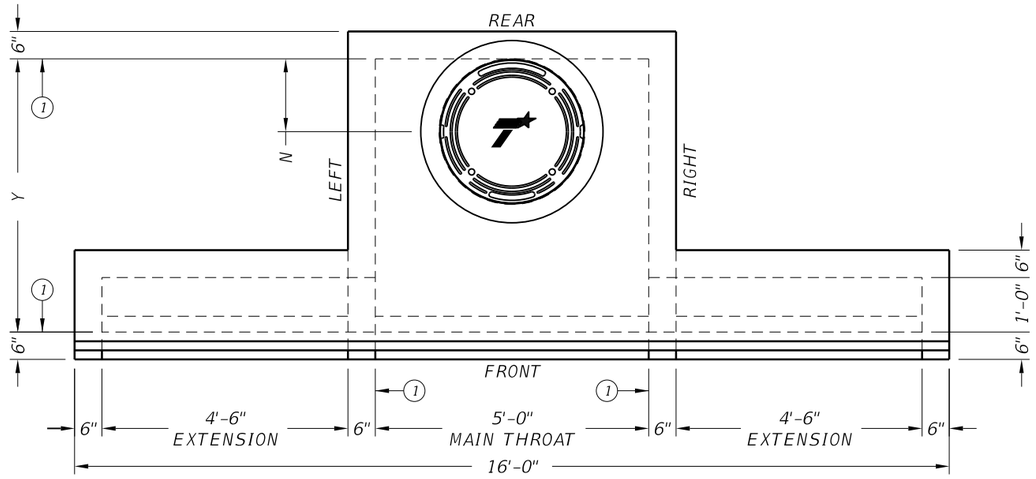
REAR VIEW

(EXTENSIONS NOT SHOWN)



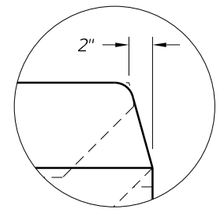
LEFT VIEW

(1) Matches inside face of wall of precast base or riser below inlet.



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



DETAIL "A"

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

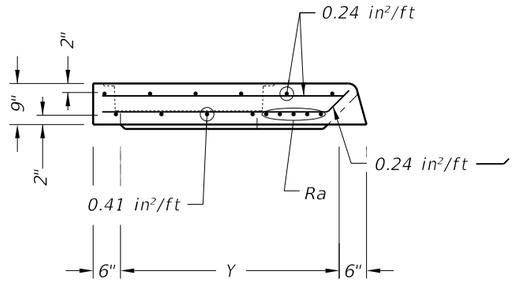
PRECAST CURB INLET OUTSIDE ROADWAY

PCO

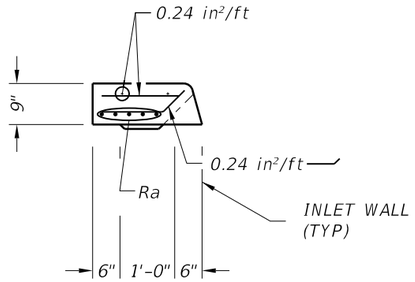
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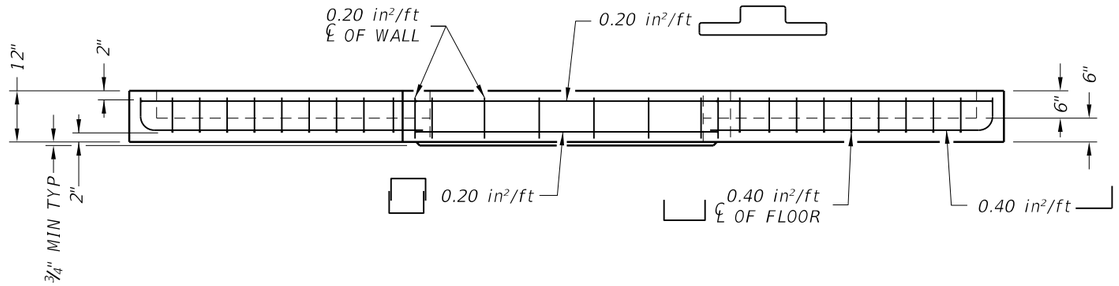
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LID SECTION A-A

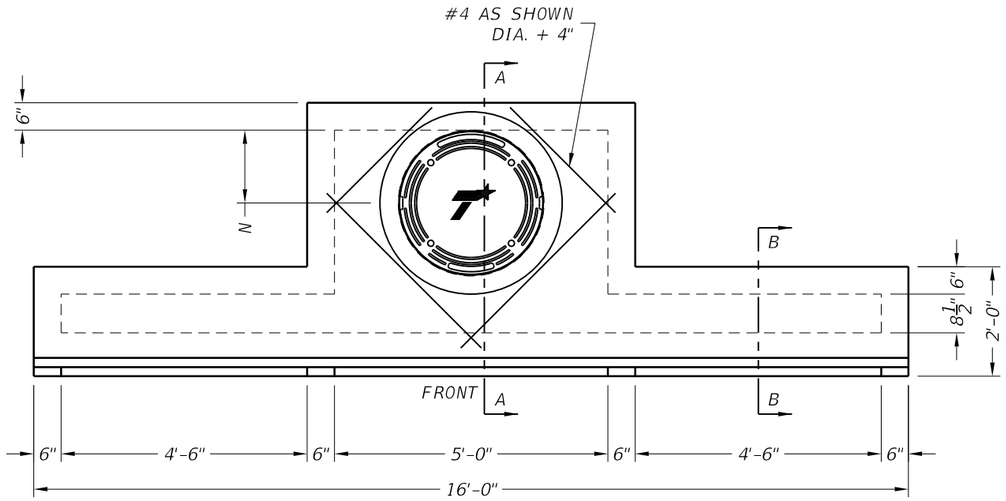


LID SECTION B-B



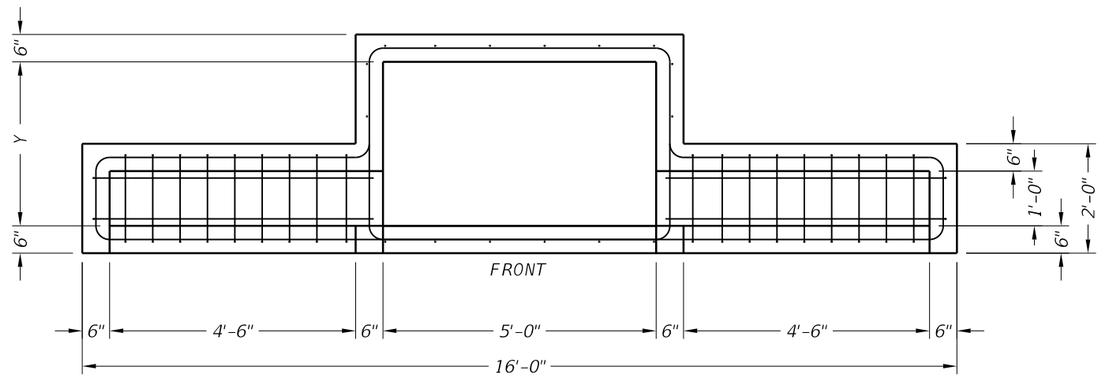
THROAT ELEVATION VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



LID PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



THROAT PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

SIZE(Y)	N	MH DIA✳	Ra
3'	9"	18"	(4) #5 Additional
4'	16"	32"	(4) #5 Additional
5'	16"	32"	(4) #5 Additional
6'	16"	32"	(4) #5 Additional

✳ Nominal ring and cover size.

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in the plans.
4. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Lid may employ a butt joint with dowels at the Contractor's option.
5. Provide lifting devices in conformance with Manufacturer's recommendations.
6. Provide cast iron solid cover, unless noted otherwise elsewhere in the plans.
7. Chamfer vertical edges of inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat and lid are not intended for direct traffic. Do not place in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 360 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, size, and extension placement. Extensions are subsidiary to inlet.

Cover dimensions are clear dimensions, unless noted otherwise.

HS20 LOADING SHEET 2 OF 2

Texas Department of Transportation | Bridge Division Standard

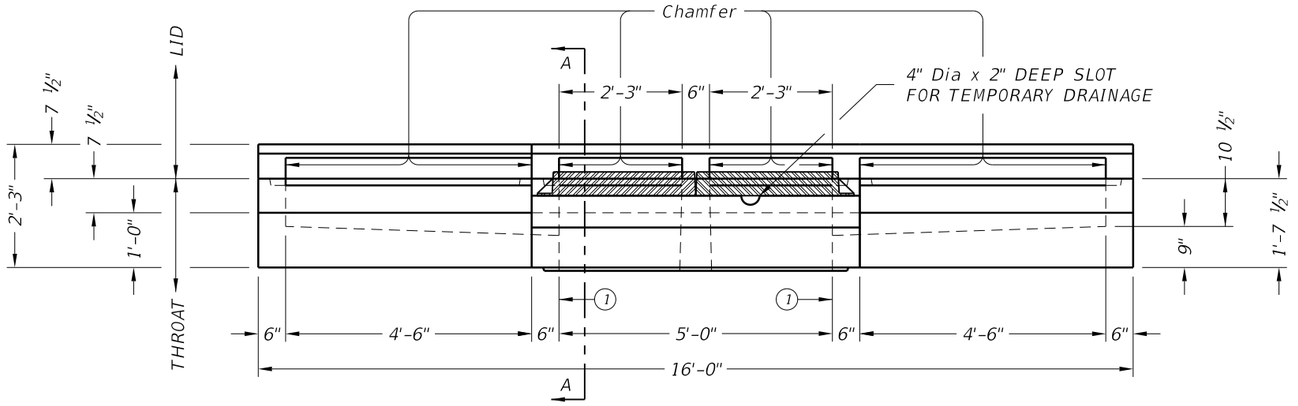
PRECAST CURB INLET OUTSIDE ROADWAY

PCO

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		207

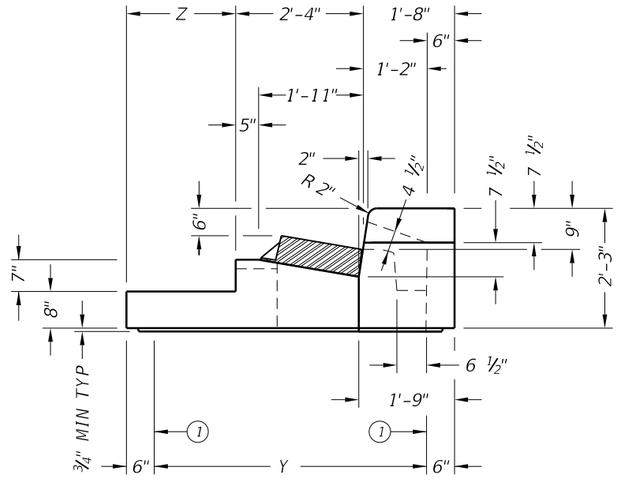
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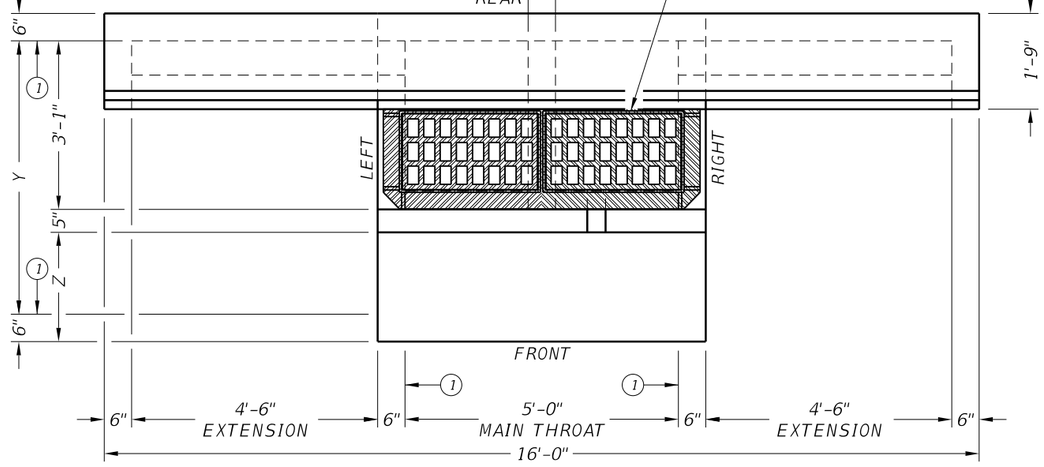


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

(1) Matches inside face of wall of precast base or riser below inlet.

HS20 LOADING

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

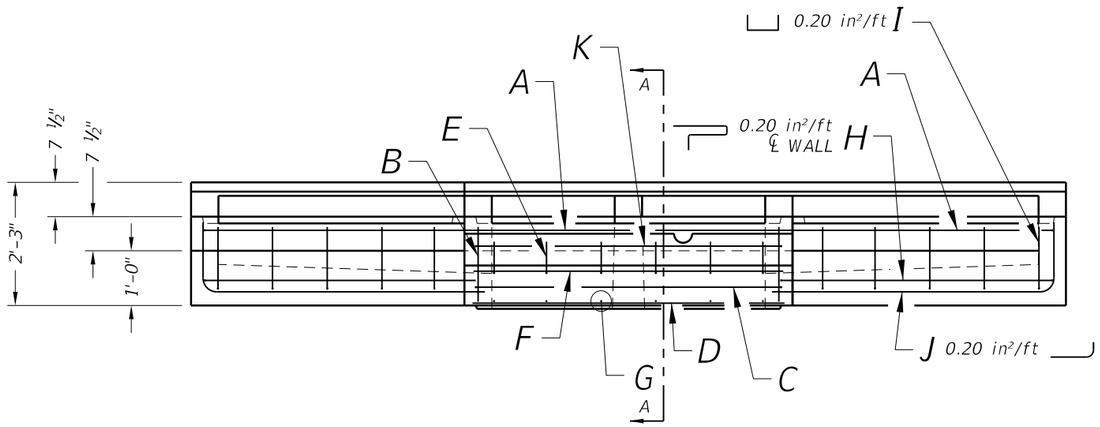
PCU

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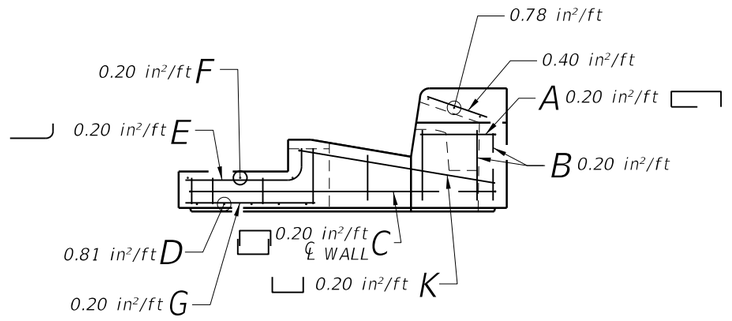
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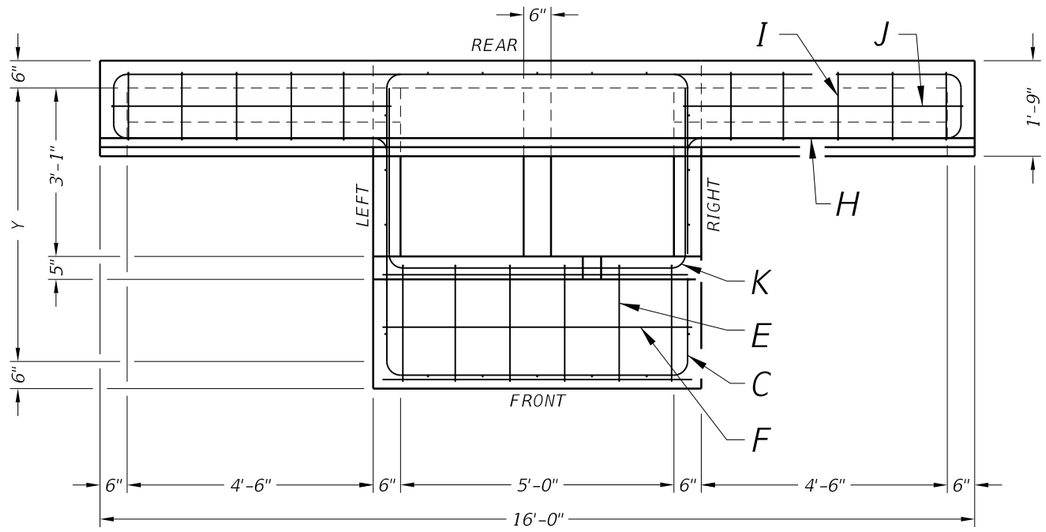


FRONT VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)



SECTION A-A



PLAN VIEW

(SHOWING LEFT AND RIGHT EXTENSIONS)

FABRICATION NOTES:

1. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
2. Provide Grade 60 reinforcing steel or equivalent area of WWR.
3. Provide typical clear cover of 1 ½" to reinforcing steel from surface of concrete or lower outside shoulder.
4. Extensions may be right, left, both or none. Provide extensions as specified elsewhere in plans.
5. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾". Top slab may employ a butt joint with dowels at the Contractor's option.
6. Provide lifting devices in conformance with Manufacturer's recommendations.
7. Chamfer vertical edges on inlet lid ¾" as shown in Front View, sheet 1.

INSTALLATION NOTES:

1. Inlet throat is placed under roadway and intended for direct traffic. Inlet lid is not for direct traffic. Do not place Inlet lid in roadway.
2. Seal tongue and groove joints and butt joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Open area of main throat = 324 sq in. Open area of one extension throat = 324 sq in.
3. Payment for inlet is per Item 465, "Junction Boxes, Manholes and Inlets" by type, size and extension placement. Extensions are subsidiary to inlet.

SIZE(Y)	Z
3'	0'
4'	1'
5'	2'
6'	3'

HS20 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST CURB INLET UNDER ROADWAY

PCU

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	Size	MAX DEPTH = 15 ft. to top of BASE SLAB										MAX DEPTH = 25 ft. to top of BASE SLAB										Min Height (See Gen Note 3)	Max HOLE DIA (See Fab Note 2)	Max KO DIA (See Fab Note 2)
		Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)				Base Slab			Base Unit or Riser Walls			Below Grade Slab (w/PJB) Reducing Slab (w/PB)						
		Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness	Reduced Riser Size	Short Span Reinf Steel Area	Long Span Reinf Steel Area	Thickness			
	X x Y	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	Ashort	Along	BS	Bshort	Blong	W	RWSxRWL or ID	Dshort	Dlong	TS	BH MIN	HOLE DIA	KO DIA
	ft.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	in^2/ft	in^2/ft	in.	ft. **	in^2/ft	in^2/ft	in.	ft.	in.	in.
Precast Junction Box (PJB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	0.37	0.37	9	0.29	0.29	6	0.24	0.24	6	N/A	0.37	0.37	9	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	0.41	0.41	9	0.47	0.47	6	0.38	0.38	6	N/A	0.41	0.41	9	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	N/A	0.48	0.48	9	0.39	0.18	6	0.23	0.59	6	N/A	0.48	0.48	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	N/A	0.42	0.42	9	0.53	0.26	6	0.39	0.59	6	N/A	0.42	0.42	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	N/A	0.43	0.43	9	0.62	0.62	6	0.59	0.59	6	N/A	0.43	0.43	9	5.5	60	60
	5x6	0.27	0.27	9	0.34	0.45	6	N/A	0.48	0.48	9	0.47	0.45	9	0.38	0.54	8	N/A	0.48	0.48	9	5.5	60/72	60/72
	6x6	0.27	0.27	9	0.45	0.45	6	N/A	0.56	0.56	9	0.52	0.52	9	0.54	0.54	8	N/A	0.56	0.56	9	6.5	72	72
	8x8	0.46	0.46	9	0.51	0.51	8	N/A	0.45	0.45	12	0.87	0.87	9	0.59	0.59	10	N/A	0.45	0.45	12	8.5	96	72
Precast Base (PB)	3x3	0.23	0.23	6	0.19	0.19	6	N/A	N/A	N/A	N/A	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	3.5	36	36
	4x4	0.29	0.29	6	0.24	0.24	6	N/A	N/A	N/A	N/A	0.47	0.47	6	0.38	0.38	6	N/A	N/A	N/A	N/A	4.5	48	48
	3x5	0.29	0.18	6	0.19	0.35	6	3x3	0.30	0.34	9	0.39	0.18	6	0.23	0.59	6	3x3	0.40	0.40	9	3.5	36/60	36/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x3	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	3x3	0.46	0.37	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	4x4	0.30	0.30	9	0.53	0.26	6	0.39	0.59	6	4x4	0.39	0.39	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	48"	0.39	0.39	9	0.53	0.26	6	0.39	0.59	6	48"	0.47	0.47	9	4.5	48/60	48/60
	4x5	0.36	0.18	6	0.22	0.34	6	3x5	0.33	0.40	9	0.53	0.26	6	0.39	0.59	6	3x5	0.48	0.48	9	4.5	48/60	48/60
	5x5	0.36	0.36	6	0.34	0.34	6	3x3	0.34	0.34	9	0.62	0.62	6	0.59	0.59	6	3x3	0.53	0.53	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	4x4	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	4x4	0.64	0.64	9	5.5	60	60
	5x5	0.38	0.38	6	0.34	0.34	6	48"	0.36	0.36	9	0.62	0.62	6	0.59	0.59	6	48"	0.64	0.64	9	5.5	60	60
	5x5	0.36	0.36	6	0.34	0.34	6	3x5	0.34	0.40	9	0.62	0.62	6	0.59	0.59	6	3x5	0.53	0.53	9	5.5	60	60
	5x6	0.31	0.31	9	0.34	0.45	6	3x3	0.34	0.34	9	0.47	0.45	9	0.38	0.54	8	3x3	0.61	0.50	9	5.5	60/72	60/72
	5x6	0.27	0.27	9	0.34	0.45	6	4x4	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	4x4	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	48"	0.36	0.45	9	0.47	0.45	9	0.38	0.54	8	48"	0.74	0.57	9	5.5	60/72	60/72
	5x6	0.29	0.29	9	0.34	0.45	6	3x5	0.45	0.45	9	0.47	0.45	9	0.38	0.54	8	3x5	0.61	0.61	9	5.5	60/72	60/72
	6x6	0.29	0.29	9	0.45	0.45	6	3x3	0.41	0.41	9	0.52	0.52	9	0.54	0.54	8	3x3	0.74	0.74	9	6.5	72	72
	6x6	0.27	0.27	9	0.45	0.45	6	4x4	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	4x4	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	48"	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	48"	0.87	0.87	9	6.5	72	72
	6x6	0.29	0.29	9	0.45	0.45	6	3x5	0.45	0.45	9	0.52	0.52	9	0.54	0.54	8	3x5	0.87	0.87	9	6.5	72	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x3	0.61	0.61	12	0.91	0.91	9	0.70	0.70	10	3x3	0.85	0.85	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	4x4	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	4x4	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	48"	0.70	0.70	12	0.87	0.87	9	0.70	0.70	10	48"	1.01	1.01	12	8.5	96	72
	8x8	0.52	0.52	9	0.51	0.51	8	3x5	0.70	0.85	12	0.87	0.87	9	0.70	0.70	10	3x5	1.01	1.01	12	8.5	96	72

** Unless otherwise indicated.

FABRICATION NOTES:
1. Maximum spacing of reinforcement is 8".
2. At manufacturer's option, provide cast or cored holes or thin wall panels (KO) to the maximum diameter shown for each. When no penetration is required, it is acceptable to provide a wall with no sectional reduction.

GENERAL NOTES:
1. Precast Junction Box consists of base slab, base unit, risers (as required), and below grade slab. See sheet PJB for details.
2. Precast Base consists of base slab, base unit, risers (as required), reducing slab (as required), and reduced risers (as required). See sheet PB for details.
3. Min Height shown is for stock base units. Use stock base units whenever practical. Smaller height base units can be used in special installation circumstances, when noted elsewhere in the plans. Absolute minimum height of base units is 2'-6".

HL93 LOADING

Texas Department of Transportation | Bridge Division Standard

DESIGN DATA FOR PRECAST BASE AND JUNCTION BOX

PDD

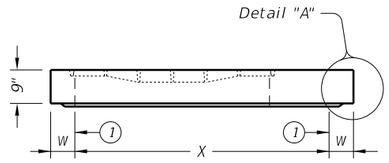
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	AUS	HAYS		210

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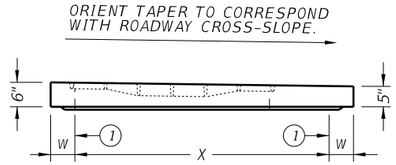
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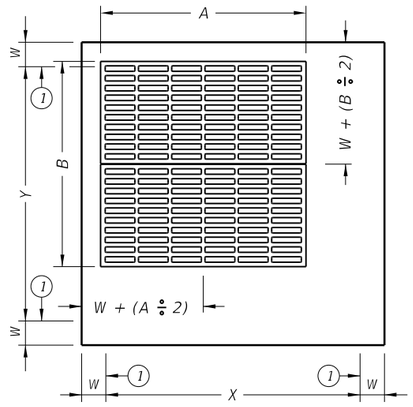
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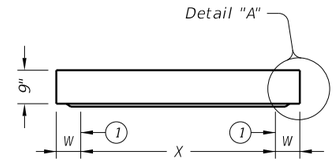
STYLE 'FG'



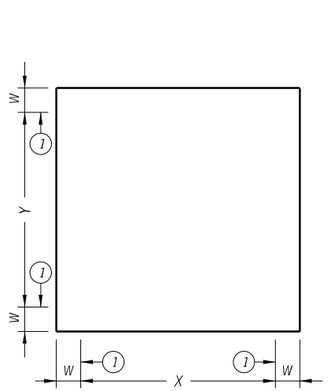
STYLE 'SFG'
ELEVATION VIEW



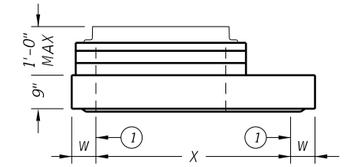
PLAN VIEW
CAST-IN FRAME & GRATE
STYLES 'FG' & 'SFG'



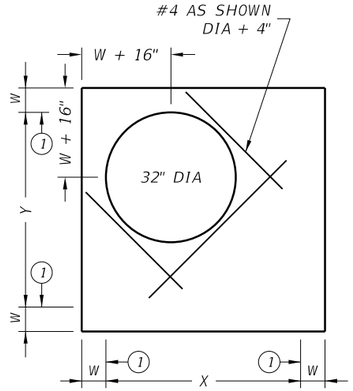
ELEVATION VIEW



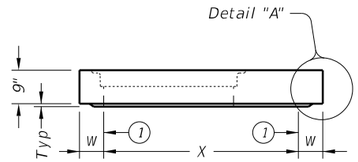
PLAN VIEW
NO OPENINGS
STYLE 'SL'



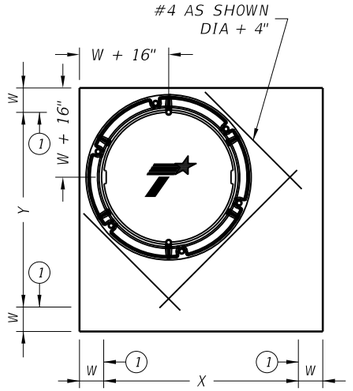
ELEVATION VIEW



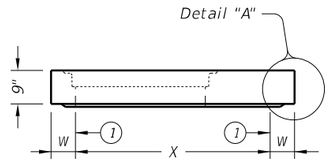
PLAN VIEW
SHIP LOOSE RING & COVER
STYLE 'RH'



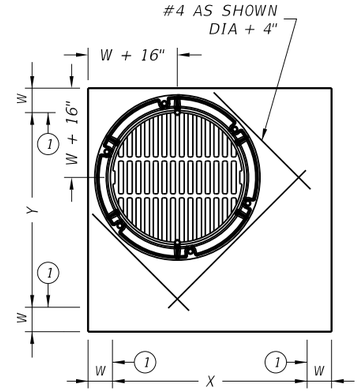
ELEVATION VIEW



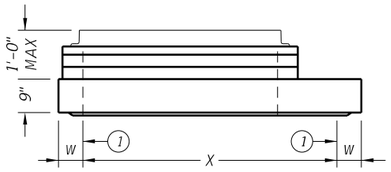
PLAN VIEW
32" DIA CAST-IN RING & COVER
STYLE 'RC'



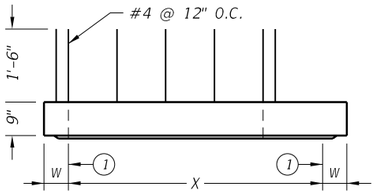
ELEVATION VIEW



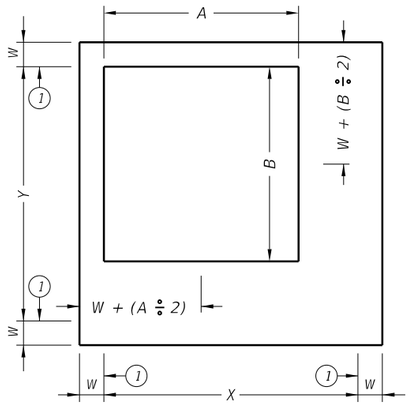
PLAN VIEW
32" DIA CAST-IN RING & GRATE
STYLE 'RG'



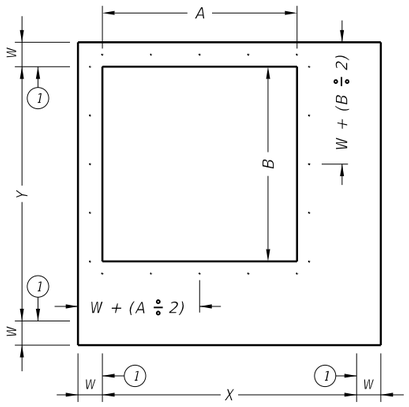
ELEVATION VIEW



ELEVATION VIEW



PLAN VIEW
SHIP LOOSE FRAME & GRATE
STYLE 'SH'



PLAN VIEW
EXPOSED REBAR
STYLE 'S1'

(1) Matches inside face of wall of precast base or riser below inlet.

HL93 LOADING SHEET 1 OF 2

Texas Department of Transportation
Bridge Division Standard

PRECAST SLAB LID

PSL

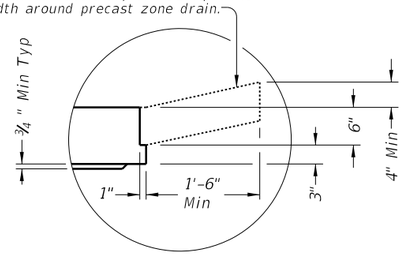
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Style	Size (X x Y)	W (2)	A x B (nominal)	Short Span Reinf Steel Area	Long Span Reinf Steel Area
SL	3'x3'	6"	n/a	0.37 in²/ft	0.37 in²/ft
RH,RC,RG,SH,S1,FG	3'x3'	6"	3'x3' or 32" Dia	0.37 in²/ft	0.37 in²/ft
SFG	3'x3'	6"	3'x3'	0.32 in²/ft	0.32 in²/ft
SL	4'x4'	6"	n/a	0.34 in²/ft	0.34 in²/ft
RH,RC,RG,SH,S1,FG	4'x4'	6"	3'x3' or 32" Dia	0.41 in²/ft	0.41 in²/ft
SH,S1,FG	4'x4'	6"	4'x4'	0.41 in²/ft	0.41 in²/ft
SFG	4'x4'	6"	4'x4'	0.32 in²/ft	0.32 in²/ft
SL	3'x5'	6"	n/a	0.39 in²/ft	0.39 in²/ft
RH,RC,RG,SH,S1,FG	3'x5'	6"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	3'x5'	6"	3'x5'	0.48 in²/ft	0.48 in²/ft
SFG	3'x5'	6"	3'x5'	0.32 in²/ft	0.32 in²/ft
SL	4'x5'	6"	n/a	0.42 in²/ft	0.42 in²/ft
RH,RC,RG,SH,S1,FG	4'x5'	6"	3'x3' or 32" Dia	0.42 in²/ft	0.42 in²/ft
SH,S1,FG	4'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	4'x5'	6"	3'x5'	0.66 in²/ft	0.66 in²/ft
SL	5'x5'	6"	n/a	0.36 in²/ft	0.36 in²/ft
RH,RC,RG,SH,S1,FG	5'x5'	6"	3'x3' or 32" Dia	0.43 in²/ft	0.43 in²/ft
SH,S1,FG	5'x5'	6"	4'x4'	0.63 in²/ft	0.63 in²/ft
SH,S1,FG	5'x5'	6"	3'x5'	0.63 in²/ft	0.63 in²/ft
SL	5'x6'	6"/8"	n/a	0.48 in²/ft	0.48 in²/ft
RH,RC,RG,SH,S1,FG	5'x6'	6"/8"	3'x3' or 32" Dia	0.48 in²/ft	0.48 in²/ft
SH,S1,FG	5'x6'	6"/8"	4'x4'	0.60 in²/ft	0.60 in²/ft
SH,S1,FG	5'x6'	6"/8"	3'x5'	0.60 in²/ft	0.60 in²/ft
SL	6'x6'	6"/8"	n/a	0.43 in²/ft	0.43 in²/ft
RH,RC,RG,SH,S1,FG	6'x6'	6"/8"	3'x3' or 32" Dia	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	4'x4'	0.56 in²/ft	0.56 in²/ft
SH,S1,FG	6'x6'	6"/8"	3'x5'	0.59 in²/ft	0.59 in²/ft
SL	8'x8'	8"/10"	n/a	0.45 in²/ft	0.45 in²/ft
RH,RC,RG,SH,S1,FG	8'x8'	8"/10"	3'x3' or 32" Dia	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	4'x4'	0.45 in²/ft	0.45 in²/ft
SH,S1,FG	8'x8'	8"/10"	3'x5'	0.45 in²/ft	0.45 in²/ft

(2) See sheet PDD for corresponding wall thickness (W) of base unit or riser.

Construct cast-in-place reinforced concrete apron, when shown elsewhere in plans. Use Class "A" concrete. Apron is subsidiary to PSL. Apron is 1'-6" Min width around precast zone drain.



DETAIL "A"

(Reinforcing not shown for clarity)

When an apron is to be cast around PSL, use detail above to create an apron ledge on all 4 sides.

FABRICATION NOTES:

1. Locate penetration (Style 'RH'), ring and cover (Style 'RC'), ring and grate (Style 'RG'), and frame and grate (Style 'FG') in a corner. Only one penetration is allowed per slab lid.
2. Provide Class "H" concrete in accordance with Item 421 and having a minimum compressive strength of 5,000 psi.
3. Provide Grade 60 reinforcing steel or equivalent area of WWR.
4. Provide clear cover of ¾" to reinforcing from lower outside shoulder of slab for structural reinforcement, and 2" from top of slab for shrinkage and temperature reinforcement. Place short span reinforcing closest to surface.
5. Slabs with a thickness of 8" or greater require shrinkage and temperature reinforcing. Provide steel area = 0.11 in²/ft each way.
6. No substitution is allowed for diagonal #4 bars around openings.
7. Design tongue and groove joints for full closure on both shoulders. Minimum spigot depth is ¾".
8. Provide lifting devices in conformance with Manufacturer's recommendations.

INSTALLATION NOTES:

1. Precast slab lids are intended for direct traffic and may be placed in roadway.
2. Seal tongue and groove joints with preformed or bulk mastic in conformance with Manufacturer's recommendations. Tongue and groove joints may be grouted no more than 1" between each section, or ½ the joint depth, whichever is greater.
3. Do not grout rubber gasket joints without Manufacturer's recommendation.
4. Initial installation of grade adjustment rings for Styles 'RH' and 'SH' is limited to 1'-0" Max as shown.
5. Grade adjustment rings for Styles 'RH' and 'SH' may be increased to 2'-0" Max when future construction affects final grade of structure. Make adjustments greater than 2'-0" with additional risers. Adjustments can be made up to Max depth shown on sheet PDD. Structure must be evaluated if Max depth will be exceeded.
6. Orient long dimension of grate slots perpendicular to traffic, unless noted otherwise on plans

GENERAL NOTES:

1. Designed according to ASTM C913.
2. Payment for lid is per Item 465, "Junction Boxes, Manholes, and Inlets" by type, style, size, and opening size (when applicable).

Cover dimensions are clear dimensions, unless noted otherwise.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

PRECAST SLAB LID

PSL

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TABLE OF DIMENSIONS AND REINFORCING STEEL
(Wings for one structure end)

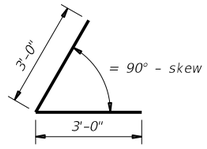
Dimensions					Variable Reinforcing				Estimated Quantities per ft of wing (2~wings) (4)		Estimated Quantities per ft of Toewall (1~toewall)	
					Bars J1		Bars J2					
Maximum Wingwall Height Hw	W	X	Y	Z	Size	Spa	Size	Spa	Reinf (Lb/Ft)	Conc (CY/Ft)	Reinf (Lb/Ft)	Conc (CY/Ft)
2'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	48.64	0.406	6.85	0.071
2'-9"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.31	0.424	6.85	0.071
3'-0"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	49.98	0.444	6.85	0.071
3'-3"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.32	0.462	6.85	0.071
3'-6"	2'-10"	10"	1'-0"	7"	#4	1'-0"	#4	1'-0"	53.98	0.480	6.85	0.071
4'-0"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	55.77	0.532	6.85	0.071
4'-6"	3'-2"	1'-2"	1'-0"	7"	#4	1'-0"	#4	1'-0"	59.77	0.568	6.85	0.071
5'-0"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	63.45	0.632	6.96	0.075
5'-6"	3'-9"	1'-7"	1'-2"	7"	#4	1'-0"	#4	1'-0"	67.46	0.668	6.96	0.075
6'-0"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	80.67	0.730	7.07	0.078
6'-6"	4'-4"	2'-0"	1'-4"	7"	#5	1'-0"	#5	1'-0"	85.05	0.768	7.07	0.078
7'-0"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	92.15	0.864	8.07	0.093
7'-6"	5'-0"	2'-3"	1'-9"	8"	#5	1'-0"	#5	1'-0"	96.54	0.902	8.07	0.093
8'-0"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	139.04	0.962	8.13	0.095
8'-6"	5'-6"	2'-8"	1'-10"	8"	#5	6"	#5	6"	144.47	1.000	8.13	0.095
9'-6"	6'-0"	2'-10"	2'-2"	9"	#5	6"	#5	6"	156.93	1.136	8.41	0.110
10'-6"	6'-5"	3'-0"	2'-5"	9"	#6	6"	#5	6"	196.27	1.234	8.57	0.117
11'-6"	7'-2"	3'-6"	2'-8"	11"	#6	6"	#6	6"	230.13	1.438	9.52	0.140
12'-6"	7'-8"	3'-9"	2'-11"	1'-0"	#7	6"	#6	6"	283.41	1.592	9.74	0.157
13'-6"	8'-2"	4'-0"	3'-2"	1'-2"	#8	6"	#6	6"	348.72	1.804	10.02	0.186
14'-6"	8'-10"	4'-5"	3'-5"	1'-4"	#9	6"	#6	6"	432.94	2.046	10.30	0.218
15'-6"	9'-6"	4'-10"	3'-8"	1'-6"	#9	6"	#7	6"	489.52	2.302	11.24	0.253
16'-0"	9'-11"	5'-0"	3'-11"	1'-7"	#9	6"	#7	6"	505.72	2.448	11.47	0.279

TABLE OF WINGWALL REINFORCING
(2~wings)

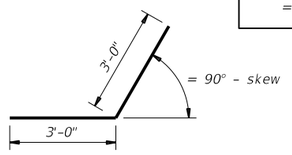
Bar	Size	No.	Spa
D1	#6	~	1'-0"
D2	#6	~	1'-0"
E1	#4	~	1'-0"
F	#4	~	1'-0"
G	#6	~	8"
M1	#4	4	~
P	#4	~	1'-0"
V	#4	~	1'-0"

TABLE OF TOEWALL REINFORCING

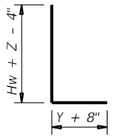
Bar	Size	No.	Spa
J3	#4	~	1'-0"
M2	#4	2	~
E2	#4	~	1'-0"



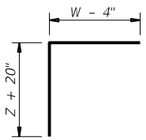
BARS D1



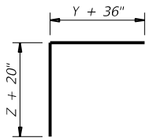
BARS D2



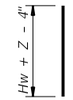
BARS J1



BARS J2



BARS J3



BARS V

WING DIMENSION FORMULAS:
(All values are in feet.)

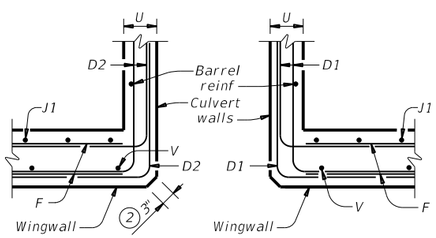
Hw = H + T + C
Lw = (Hw) (SL) ÷ cosine (θ) for Type PW-1
= (Hw - 1') (SL) ÷ cosine (θ) for Type PW-2 and Hw ≥ 4'
= (Hw - 0.5') (SL) ÷ cosine (θ) for Type PW-2 and Hw < 4'

For cast-in-place culverts:
Ltw = [(N) (S) + (N + 1) (U)] ÷ cosine (θ)

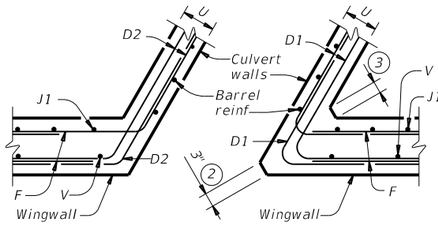
For precast culverts:
Ltw = [(N) (2 U + S) + (N - 1) (0.5')] ÷ cosine (θ)
Total Wingwall Area (two wings ~ SF)
= (2)(Hw)(Lw) for Type PW-1
= (2)(Hw)(Lw) - 6 SF for Type PW-2 and Hw ≥ 4'
= (2)(Hw)(Lw) - 1.5 SF for Type PW-2 and Hw < 4'

Hw = Height of wingwall
Lw = Length of wingwall
Ltw = Culvert toewall length
N = Number of culvert spans
SL:1 = Channel slope ratio. (horizontal: 1 vertical, usual value is 2:1)
θ = Culvert skew

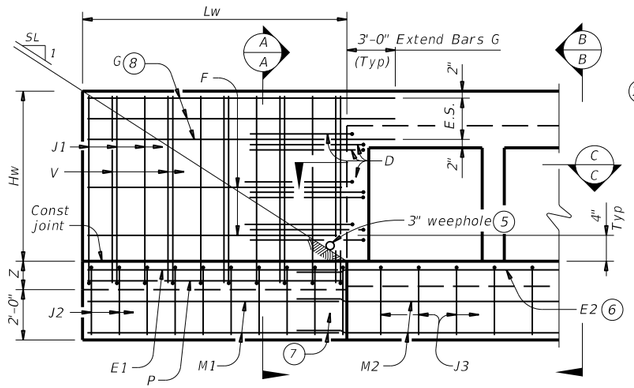
See applicable box culvert standard sheet for S, H, T, and U values.



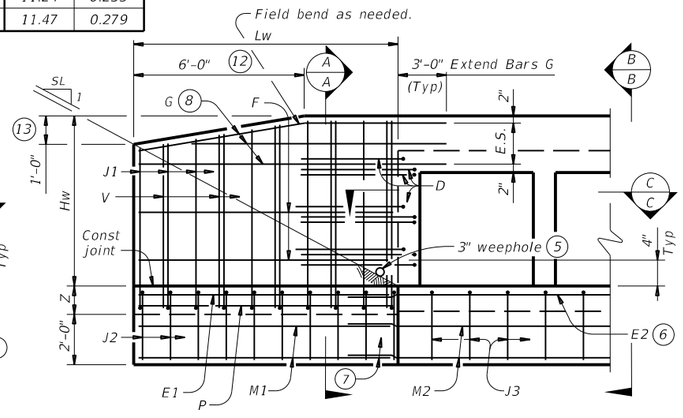
SECTION C-C - PW-1



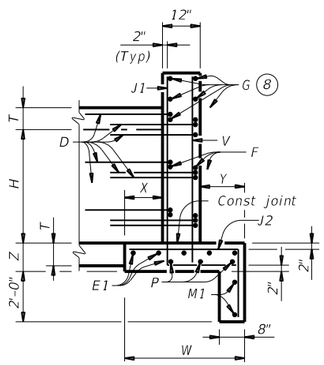
SECTION C-C - PW-2



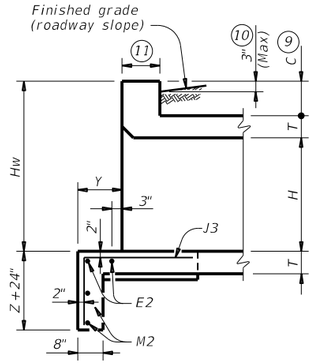
PARTIAL ELEVATION - PW-1



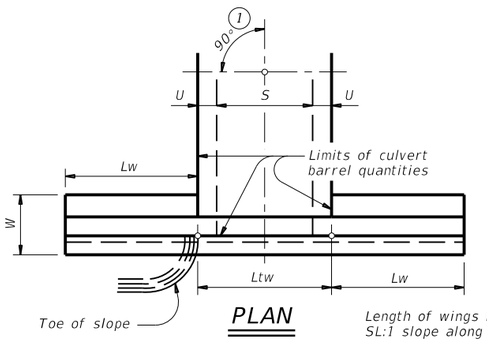
PARTIAL ELEVATION - PW-2



SECTION A-A
(Showing wing reinforcement.)

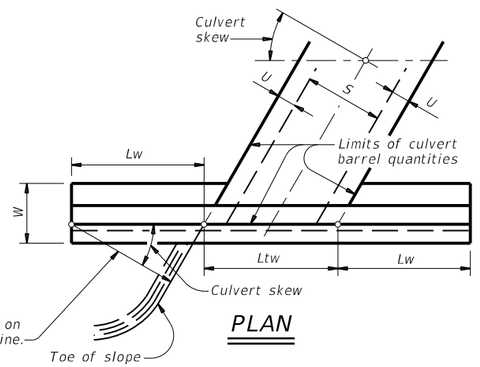


SECTION B-B
(Showing wing reinforcement.)



PLAN

DETAILS FOR NON-SKEWED BOX CULVERTS



PLAN

DETAILS FOR SKEWED BOX CULVERTS
(Showing 30° skew.)

1. Skew = 0°
2. At discharge end, chamfer may be ¾" minimum.
3. For 15° skew ~ 1"
   For 30° skew ~ 2"
   For 45° skew ~ 3"
4. Quantities shown are for two Type PW-1 wings. Adjust concrete volume for Type PW-2 wings. To determine estimated quantities for two wings, multiply the tabulated values by Lw. Quantities shown do not include weight of Bars D.
5. Provide weepholes for Hw = 5'-0" and greater. Fill around weepholes with coarse gravel.
6. Extend Bars E2 1'-6" minimum into the wingwall footing.
7. Lap Bars M1 1'-6" minimum with Bars M2.
8. Place Bars G as shown, equally spaced at 8" maximum. Provide at least two pairs of Bars G per wing.
9. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
10. For vehicle safety, the following requirements must be met:
    - For structures without bridge rail, construct curbs no more than 3" above finished grade.
    - For structures with bridge rail, construct curbs flush with finished grade.

    Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
11. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elswhere in the plans.
12. 3'-0" for Hw < 4'.
13. 6" for Hw < 4'.

DESIGNER NOTES:
Type PW-1 can be used for all applications and must be used if railing is to be mounted to the wingwall.
Type PW-2 can only be used for applications without a railing mounted to the wingwall.

MATERIAL NOTES:
Provide Class C concrete (f'c=3,600 psi).
Provide Grade 60 reinforcing steel.
Provide galvanized reinforing steel if required elsewhere in the plans.

GENERAL NOTES:
Designed in accordance with AASHTO LRFD Bridge Design Specifications.
Depth of toewalls for wingwalls and culverts may be reduced or eliminated when founded on solid rock, when directed by the Engineer.
See Box Culvert Supplement (BCS) standard sheet for wingwall type and additional dimensions and information.
Quantities for concrete and reinforcing steel resulting from the formulas given on this sheet are for the Contractor's information only.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out-to-out of bars.

Texas Department of Transportation
Bridge Division Standard

CONCRETE WINGWALLS
WITH PARALLEL WINGS FOR BOX CULVERTS
TYPES PW-1 AND PW-2

PW

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	DIST	COUNTY		SHEET NO.
	AUS	HAYS		213

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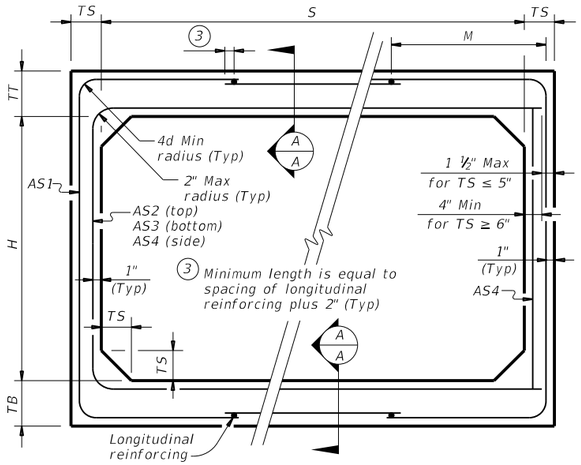
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
3	2	7	6	4	< 2	–	0.17	0.25	0.16	0.10	0.17	0.17	0.14	3.3
3	2	4	4	4	2 < 3	31	0.13	0.19	0.18	0.10	–	–	–	2.4
3	2	4	4	4	3 – 5	31	0.10	0.11	0.12	0.10	–	–	–	2.4
3	2	4	4	4	10	31	0.10	0.10	0.10	0.10	–	–	–	2.4
3	2	4	4	4	15	31	0.10	0.13	0.13	0.10	–	–	–	2.4
3	2	4	4	4	20	31	0.11	0.17	0.17	0.10	–	–	–	2.4
3	2	4	4	4	25	31	0.14	0.21	0.21	0.10	–	–	–	2.4
3	2	4	4	4	30	31	0.17	0.25	0.25	0.10	–	–	–	2.4
3	2	4	4	4	35	31	0.20	0.29	0.30	0.10	–	–	–	2.4
3	3	7	6	4	< 2	–	0.17	0.27	0.17	0.10	0.17	0.17	0.14	3.7
3	3	4	4	4	2 < 3	31	0.10	0.22	0.21	0.10	–	–	–	2.8
3	3	4	4	4	3 – 5	31	0.10	0.14	0.14	0.10	–	–	–	2.8
3	3	4	4	4	10	31	0.10	0.11	0.11	0.10	–	–	–	2.8
3	3	4	4	4	15	31	0.10	0.14	0.15	0.10	–	–	–	2.8
3	3	4	4	4	20	31	0.10	0.18	0.19	0.10	–	–	–	2.8
3	3	4	4	4	25	31	0.10	0.23	0.23	0.10	–	–	–	2.8
3	3	4	4	4	30	31	0.12	0.27	0.28	0.10	–	–	–	2.8
3	3	4	4	4	35	31	0.14	0.32	0.32	0.10	–	–	–	2.8

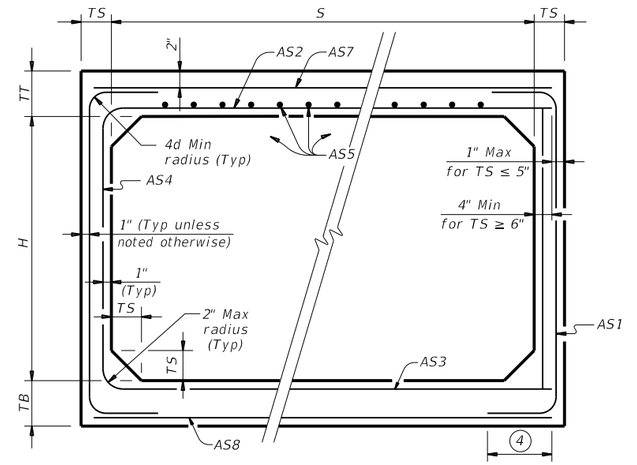
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

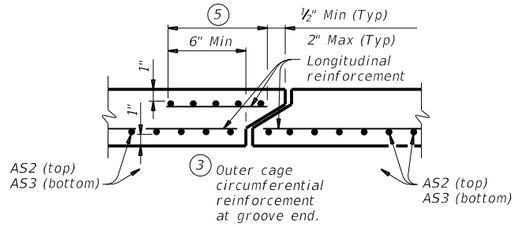
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

3'-0" SPAN

SCP-3

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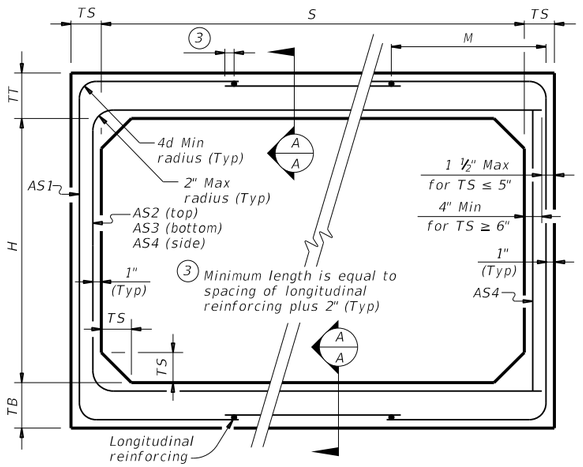
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) ②							① Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
4	2	7.5	6	5	< 2	–	0.18	0.27	0.15	0.12	0.18	0.18	0.14	4.5
4	2	5	5	5	2 < 3	38	0.18	0.19	0.17	0.12	–	–	–	3.6
4	2	5	5	5	3 – 5	38	0.13	0.13	0.13	0.12	–	–	–	3.6
4	2	5	5	5	10	38	0.12	0.12	0.12	0.12	–	–	–	3.6
4	2	5	5	5	15	38	0.14	0.16	0.16	0.12	–	–	–	3.6
4	2	5	5	5	20	38	0.18	0.20	0.21	0.12	–	–	–	3.6
4	2	5	5	5	25	38	0.23	0.25	0.25	0.12	–	–	–	3.6
4	2	5	5	5	30	38	0.28	0.30	0.30	0.12	–	–	–	3.6
4	3	7.5	6	5	< 2	–	0.18	0.31	0.18	0.12	0.18	0.18	0.14	5.0
4	3	5	5	5	2 < 3	38	0.15	0.23	0.20	0.12	–	–	–	4.1
4	3	5	5	5	3 – 5	38	0.12	0.16	0.16	0.12	–	–	–	4.1
4	3	5	5	5	10	38	0.12	0.14	0.14	0.12	–	–	–	4.1
4	3	5	5	5	15	38	0.12	0.18	0.18	0.12	–	–	–	4.1
4	3	5	5	5	20	38	0.14	0.23	0.24	0.12	–	–	–	4.1
4	3	5	5	5	25	38	0.17	0.29	0.29	0.12	–	–	–	4.1
4	3	5	5	5	30	38	0.21	0.35	0.35	0.12	–	–	–	4.1
4	4	7.5	6	5	< 2	–	0.18	0.33	0.20	0.12	0.18	0.18	0.14	5.5
4	4	5	5	5	2 < 3	38	0.12	0.26	0.23	0.12	–	–	–	4.6
4	4	5	5	5	3 – 5	38	0.12	0.18	0.18	0.12	–	–	–	4.6
4	4	5	5	5	10	38	0.12	0.15	0.15	0.12	–	–	–	4.6
4	4	5	5	5	15	38	0.12	0.19	0.20	0.12	–	–	–	4.6
4	4	5	5	5	20	38	0.12	0.25	0.25	0.12	–	–	–	4.6
4	4	5	5	5	25	38	0.14	0.31	0.31	0.12	–	–	–	4.6
4	4	5	5	5	30	38	0.17	0.37	0.37	0.12	–	–	–	4.6

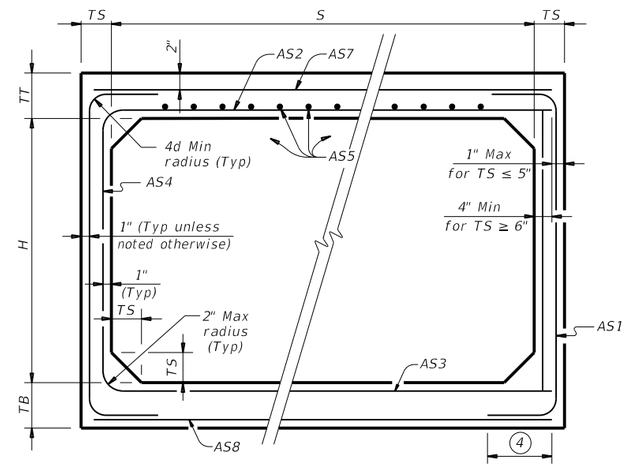
① For box length = 8'-0"

② AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

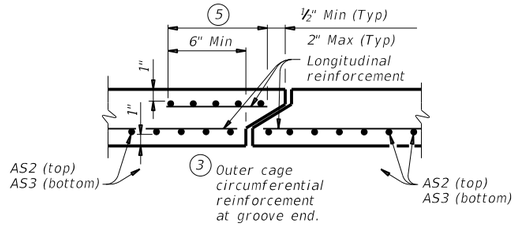
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

④ Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

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HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

4'-0" SPAN

SCP-4

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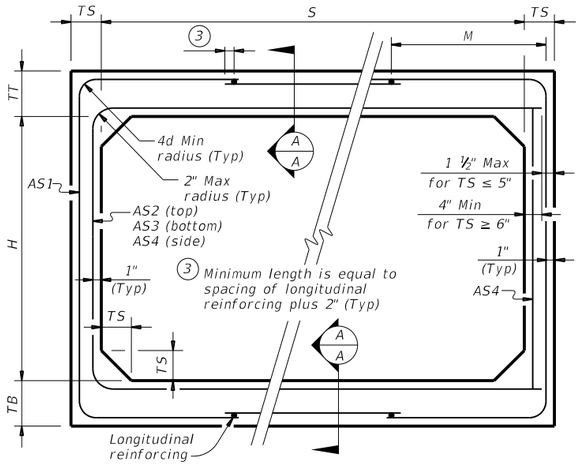
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
5	2	8	7	6	< 2	–	0.19	0.27	0.18	0.14	0.19	0.19	0.17	6.0
5	2	6	6	6	2 < 3	44	0.22	0.20	0.16	0.14	–	–	–	5.1
5	2	6	6	6	3 – 5	44	0.16	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	10	36	0.15	0.14	0.14	0.14	–	–	–	5.1
5	2	6	6	6	15	36	0.20	0.18	0.18	0.14	–	–	–	5.1
5	2	6	6	6	20	36	0.26	0.23	0.24	0.14	–	–	–	5.1
5	2	6	6	6	25	36	0.33	0.29	0.29	0.14	–	–	–	5.1
5	2	6	6	6	30	36	0.39	0.34	0.35	0.14	–	–	–	5.1
5	3	8	7	6	< 2	–	0.19	0.31	0.21	0.14	0.19	0.19	0.17	6.6
5	3	6	6	6	2 < 3	45	0.18	0.24	0.19	0.14	–	–	–	5.7
5	3	6	6	6	3 – 5	36	0.14	0.17	0.16	0.14	–	–	–	5.7
5	3	6	6	6	10	36	0.14	0.16	0.17	0.14	–	–	–	5.7
5	3	6	6	6	15	35	0.16	0.21	0.22	0.14	–	–	–	5.7
5	3	6	6	6	20	35	0.21	0.27	0.28	0.14	–	–	–	5.7
5	3	6	6	6	25	35	0.26	0.34	0.34	0.14	–	–	–	5.7
5	3	6	6	6	30	35	0.31	0.41	0.41	0.14	–	–	–	5.7
5	4	8	7	6	< 2	–	0.19	0.33	0.24	0.14	0.19	0.19	0.17	7.2
5	4	6	6	6	2 < 3	45	0.16	0.27	0.22	0.14	–	–	–	6.3
5	4	6	6	6	3 – 5	45	0.14	0.19	0.18	0.14	–	–	–	6.3
5	4	6	6	6	10	36	0.14	0.18	0.18	0.14	–	–	–	6.3
5	4	6	6	6	15	35	0.14	0.23	0.24	0.14	–	–	–	6.3
5	4	6	6	6	20	35	0.17	0.30	0.31	0.14	–	–	–	6.3
5	4	6	6	6	25	35	0.21	0.37	0.38	0.14	–	–	–	6.3
5	4	6	6	6	30	35	0.25	0.44	0.45	0.14	–	–	–	6.3
5	5	8	7	6	< 2	–	0.19	0.35	0.26	0.14	0.19	0.19	0.17	7.8
5	5	6	6	6	2 < 3	45	0.14	0.29	0.24	0.14	–	–	–	6.9
5	5	6	6	6	3 – 5	45	0.14	0.21	0.20	0.14	–	–	–	6.9
5	5	6	6	6	10	45	0.14	0.19	0.20	0.14	–	–	–	6.9
5	5	6	6	6	15	36	0.14	0.24	0.25	0.14	–	–	–	6.9
5	5	6	6	6	20	35	0.15	0.31	0.32	0.14	–	–	–	6.9
5	5	6	6	6	25	35	0.18	0.38	0.39	0.14	–	–	–	6.9
5	5	6	6	6	30	35	0.21	0.46	0.47	0.14	–	–	–	6.9

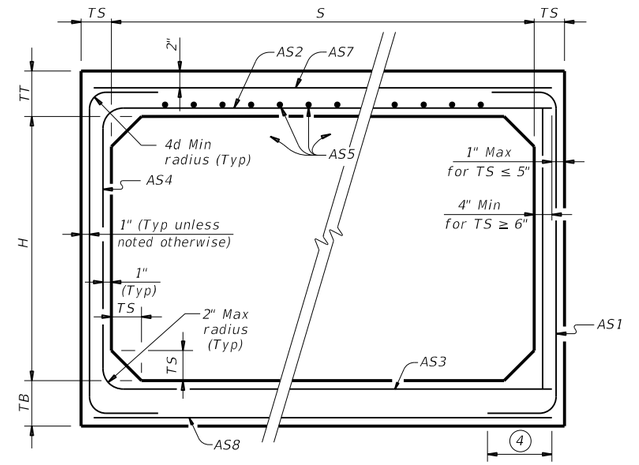
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

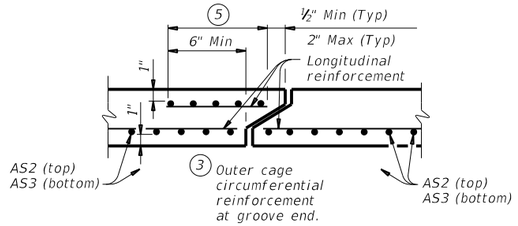
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

In lieu of furnishing the designs shown on this sheet, the contractor may furnish an alternate design that is equal to or exceeds the box design for the design fill height in the table. Submit shop plans for alternate designs in accordance with Item "Precast Concrete Structural Members (Fabrication)".

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

5'-0" SPAN

SCP-5

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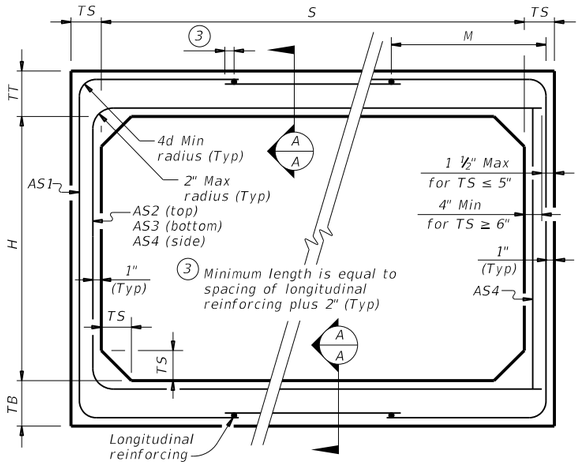
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BOX DATA

SECTION DIMENSIONS					Fill Height	M (Min)	REINFORCING (sq. in. / ft.) (2)							(1) Lift Weight
S (ft.)	H (ft.)	TT (in.)	TB (in.)	TS (in.)	(ft.)	(in.)	AS1	AS2	AS3	AS4	AS5	AS7	AS8	(tons)
7	3	8	8	8	< 2	–	0.23	0.31	0.22	0.19	0.19	0.19	0.19	9.6
7	3	8	8	8	2 < 3	47	0.27	0.25	0.24	0.19	–	–	–	9.6
7	3	8	8	8	3 – 5	43	0.19	0.19	0.19	0.19	–	–	–	9.6
7	3	8	8	8	10	43	0.21	0.20	0.21	0.19	–	–	–	9.6
7	3	8	8	8	15	43	0.28	0.26	0.27	0.19	–	–	–	9.6
7	3	8	8	8	20	43	0.36	0.34	0.35	0.19	–	–	–	9.6
7	3	8	8	8	25	43	0.45	0.42	0.43	0.19	–	–	–	9.6
7	3	8	8	8	30	43	0.54	0.50	0.51	0.19	–	–	–	9.6
7	4	8	8	8	< 2	–	0.21	0.34	0.25	0.19	0.19	0.19	0.19	10.4
7	4	8	8	8	2 < 3	43	0.23	0.28	0.28	0.19	–	–	–	10.4
7	4	8	8	8	3 – 5	43	0.19	0.22	0.19	0.19	–	–	–	10.4
7	4	8	8	8	10	43	0.19	0.23	0.23	0.19	–	–	–	10.4
7	4	8	8	8	15	41	0.24	0.30	0.30	0.19	–	–	–	10.4
7	4	8	8	8	20	41	0.31	0.38	0.39	0.19	–	–	–	10.4
7	4	8	8	8	25	41	0.38	0.47	0.48	0.19	–	–	–	10.4
7	4	8	8	8	30	41	0.46	0.57	0.57	0.19	–	–	–	10.4
7	5	8	8	8	< 2	–	0.19	0.36	0.27	0.19	0.19	0.19	0.19	11.2
7	5	8	8	8	2 < 3	47	0.21	0.31	0.31	0.19	–	–	–	11.2
7	5	8	8	8	3 – 5	43	0.19	0.24	0.21	0.19	–	–	–	11.2
7	5	8	8	8	10	43	0.19	0.25	0.26	0.19	–	–	–	11.2
7	5	8	8	8	15	41	0.21	0.32	0.33	0.19	–	–	–	11.2
7	5	8	8	8	20	41	0.27	0.41	0.42	0.19	–	–	–	11.2
7	5	8	8	8	25	41	0.33	0.51	0.52	0.19	–	–	–	11.2
7	5	8	8	8	30	41	0.40	0.61	0.62	0.19	–	–	–	11.2
7	6	8	8	8	< 2	–	0.19	0.38	0.30	0.19	0.19	0.19	0.19	12.0
7	6	8	8	8	2 < 3	59	0.19	0.33	0.34	0.19	–	–	–	12.0
7	6	8	8	8	3 – 5	47	0.19	0.25	0.23	0.19	–	–	–	12.0
7	6	8	8	8	10	43	0.19	0.26	0.27	0.19	–	–	–	12.0
7	6	8	8	8	15	41	0.19	0.34	0.35	0.19	–	–	–	12.0
7	6	8	8	8	20	41	0.24	0.43	0.45	0.19	–	–	–	12.0
7	6	8	8	8	25	41	0.29	0.53	0.55	0.19	–	–	–	12.0
7	6	8	8	8	30	41	0.35	0.64	0.65	0.19	–	–	–	12.0
7	7	8	8	8	< 2	–	0.19	0.40	0.33	0.19	0.19	0.19	0.19	12.8
7	7	8	8	8	2 < 3	59	0.19	0.36	0.37	0.19	–	–	–	12.8
7	7	8	8	8	3 – 5	59	0.19	0.27	0.25	0.19	–	–	–	12.8
7	7	8	8	8	10	47	0.19	0.27	0.29	0.19	–	–	–	12.8
7	7	8	8	8	15	43	0.19	0.35	0.37	0.19	–	–	–	12.8
7	7	8	8	8	20	43	0.22	0.44	0.46	0.19	–	–	–	12.8
7	7	8	8	8	25	43	0.27	0.54	0.57	0.19	–	–	–	12.8
7	7	8	8	8	30	41	0.32	0.65	0.67	0.19	–	–	–	12.8

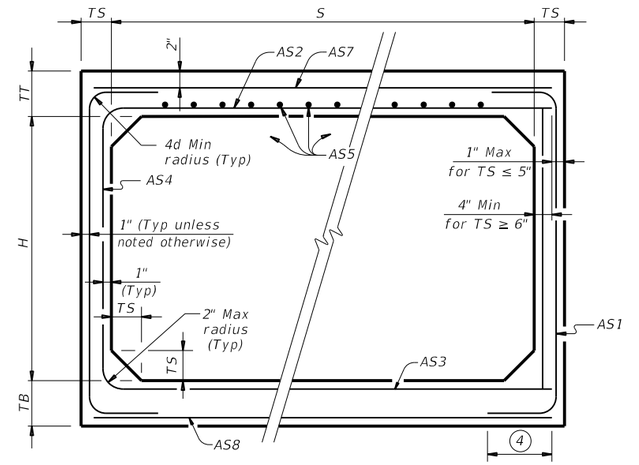
(1) For box length = 8'-0"

(2) AS1 thru AS4, AS7 and AS8 are minimum required areas of reinforcement per linear foot of box length. AS5 is minimum required area of reinforcement per linear foot of box width.



CORNER OPTION "A" CORNER OPTION "B"

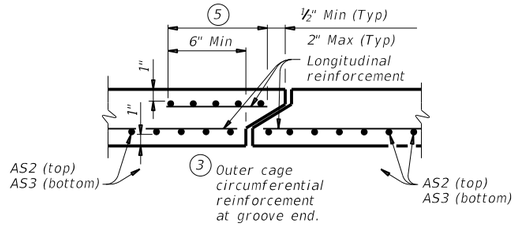
FILL HEIGHT 2 FT AND GREATER



CORNER OPTION "A" CORNER OPTION "B"

FILL HEIGHT LESS THAN 2 FT

(4) Length is equal to spacing of longitudinal reinforcing plus 2". (10" Min) (Typ)



SECTION A-A

(Showing top and bottom slab joint reinforcement.)

MATERIAL NOTES:

Provide 0.03 sq. in./ft. minimum longitudinal reinforcement at each face in slabs and walls. This minimum requirement may be met by the transverse wires when wire mesh reinforcement is used.

Provide Class H concrete (f`c = 5,000 psi).

GENERAL NOTES:

Designs shown conform to ASTM C1577. Refer to ASTM C1577 for information or details not shown.

See Box Culverts Precast Miscellaneous Details (SCP-MD) standard sheet for details and notes not shown.

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HL93 LOADING

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Bridge Division Standard

SINGLE BOX CULVERTS PRECAST

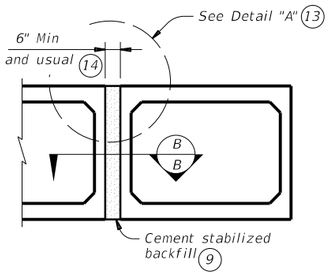
7'-0" SPAN

SCP-7

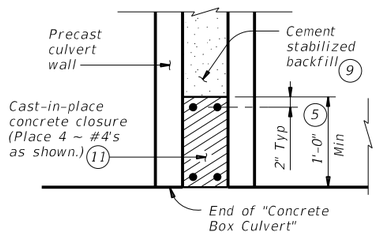
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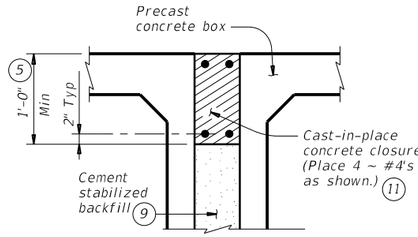
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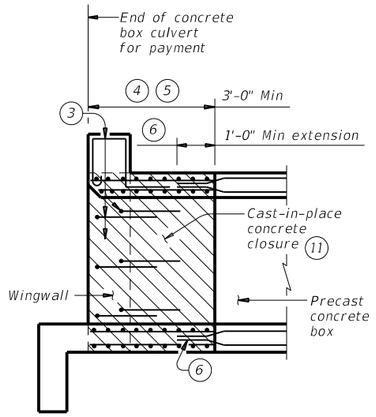
MULTIPLE UNIT PLACEMENT



SECTION B-B

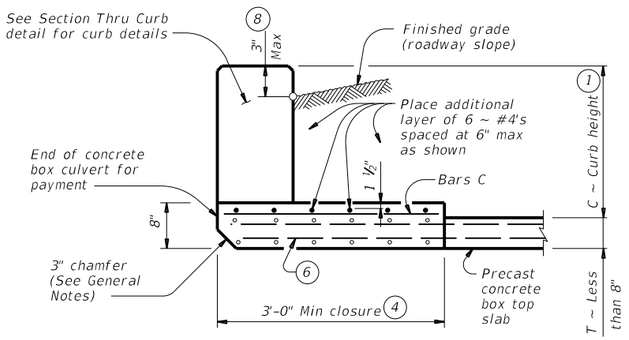


DETAIL "A" (13)

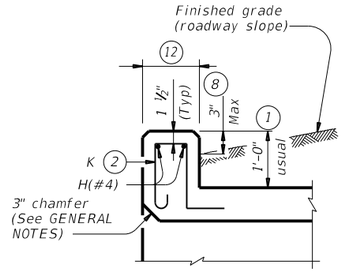


WINGWALL CONNECTION

(Also applies to safety end treatment.)

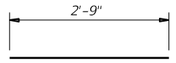


SECTION THRU TOP SLABS LESS THAN 8"

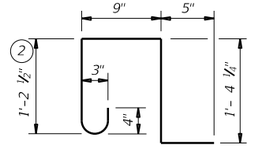


SECTION THRU CURB

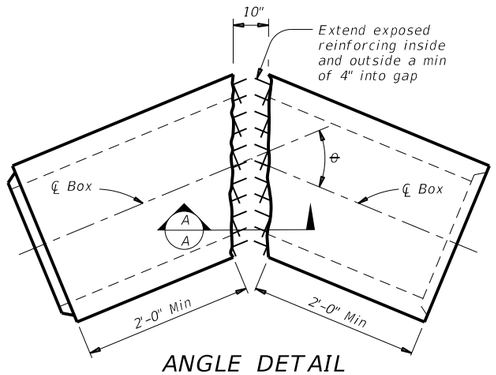
QUANTITIES PER FOOT OF CURB (10)	
Reinforcing Steel	4.12 Lb
Concrete	0.037 CY



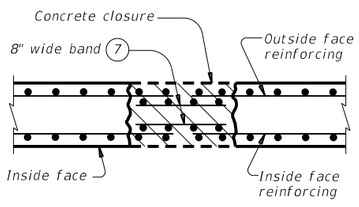
BARS C (#4)
(Spa = 1'-0" Max)



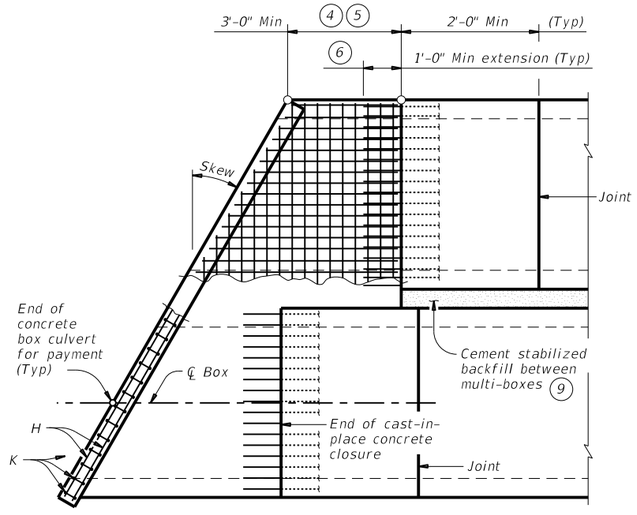
BARS K (#4)
(Spa = 1'-0" Max)
(Length = 4'-2")



ANGLE DETAIL



SECTION A-A



PLAN OF SKEWED ENDS

(Showing multi-box placement.)

1. 0" Min to 5'-0" Max. Estimated curb heights are shown elsewhere in the plans. For structures with pedestrian rail, bicycle rail, or curbs taller than 1'-0, refer to the Extended Curb Details (ECD) standard sheet. For structures with T631 or T631LS bridge rail, refer to the Mounting Details for T631 & T631LS Rails (T631-CM) standard sheet. Refer to the Box Culvert Rail Mounting Details (RAC) standard sheet for structures with bridge rail other than T631 or T631LS.
2. For curbs less than 1'-0" high, tilt Bars K or reduce bar height as necessary to maintain cover. For curbs less than 3" high, Bars K may be omitted.
3. Extend curb, wingwall, or safety end treatment reinforcing into concrete closure. Bend or trim, as necessary, any reinforcing that does not fit into closure area.
4. Provide a 3'-0" Min cast-in-place concrete closure. Break back boxes in the field or cast boxes short. Provide bands of reinforcing in the closure that are the same size and spacing as in the precast box section. Provide #4 longitudinal reinforcement spaced at 12 inches Max within the closure. Except where shown otherwise, construct the cast-in-place closure flush with the inside and outside faces of the precast box section.
5. For multiple unit placements, adjust the length of the closure for the interior walls as necessary. Provide a 3'-0" Min cast-in-place closure in the top slab, bottom slab, and exterior wall. See Section B-B detail when interior walls are cast full length.
6. Extend precast box reinforcing a minimum of 1'-0" into concrete closure (Typ).
7. Place bands of reinforcing matching the inside and outside face reinforcing in the gaps of the top and bottom slabs. Place a band matching the outside face reinforcing of the wall in the gaps of the walls (placed in the outside face only). Tack weld the bands to the exposed reinforcing at each point of contact.
8. For vehicle safety, the following requirements must be met:
   - For structures without bridge rail, construct curbs no more than 3" above finished grade.
   - For structures with bridge rail, construct curbs flush with finished grade.

   Reduce curb heights, if necessary, to meet the above requirements. No changes will be made in quantities and no additional compensation will be allowed for this work.
9. Cement stabilized backfill between boxes is considered part of the box culvert for payment.
10. All curb concrete and reinforcing is considered part of the box culvert for payment.
11. Any additional concrete and reinforcing required for the closures will be considered subsidiary to the box culvert for payment.
12. 1'-0" typical. 2'-3" when the Box Culvert Rail Mounting Details (RAC) standard sheet is referred to elsewhere in the plans.
13. For multiple unit placement with overlay, with 1 to 2 course surface treatment, or with the top slab as the final riding surface, provide wall closure as shown in Detail "A".
14. This dimension may be increased with approval of the Engineer to allow the precast boxes to be tunneled or jacked in accordance with Item 476, "Jacking, Boring, or Tunneling Pipe or Box". No payment will be made for any additional material in the gap between adjacent boxes.

MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide ASTM A1064 welded wire reinforcement.
Provide Class C concrete (f'c = 3,600 psi) for the closures.
Provide cement stabilized backfill meeting the requirements of Item 400, "Excavation and Backfill for Structures."
Any additional concrete required for the closures will be considered subsidiary to the box culvert.

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
Refer to the Single Box Culverts Precast (SCP) standard sheets for details and notes not shown.
Chamfer the bottom edge of the top slab closure 3 inches at culvert closure ends.

Cover dimensions are clear dimensions, unless noted otherwise.
Reinforcing bars dimensions are out-to-out of bars.

HL93 LOADING

Texas Department of Transportation

Bridge Division Standard

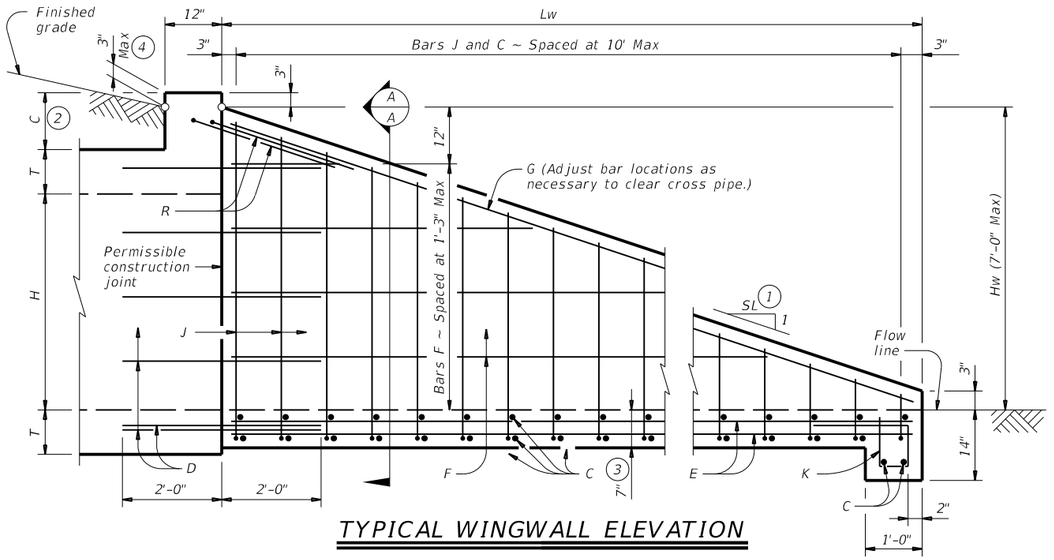
BOX CULVERTS PRECAST MISCELLANEOUS DETAILS

SCP-MD

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	DIST	COUNTY		SHEET NO.
	AUS	HAYS		218

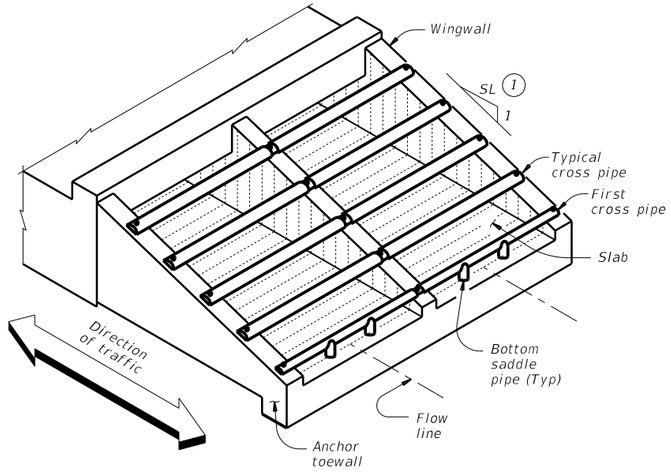
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TYPICAL WINGWALL ELEVATION

(Cross pipes not shown for clarity.)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing bolted anchor option.)

WING DIMENSION CALCULATIONS:

Hw = H + T + C – 0.250'
Lw = (Hw – 0.333') (SL)

For cast–in–place culverts:
Atw = (N) (S) + (N + 1) (U)
For precast culverts:
Atw = (N) (2U + S) + (N – 1) (0.500')

Total Wingwall Area (SF)
= (0.5) (Hw + 0.333') (Lw) (N – 1)
Total Concrete Volume (CY)
= [(Wingwall Area) (0.583') +
(Lw) (Atw) (0.583') +
(Atw) (1.167') (1.167' – 0.583')] ÷ (27)

PIPE RUNNER DIMENSION CALCULATIONS:

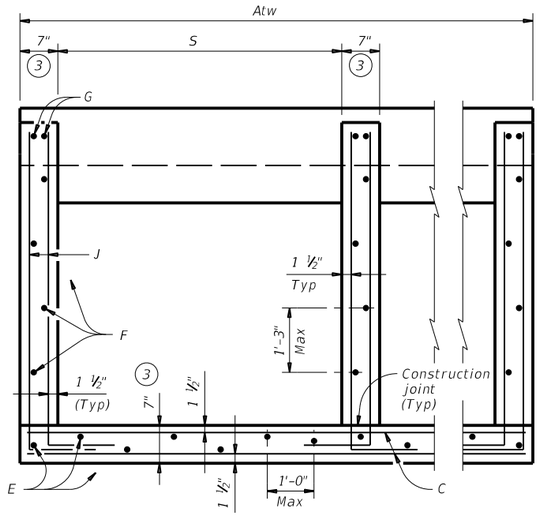
Pipe Runner Length (feet)
= (Lw) (K1) = (1.917')
Total Reinforcing (Lb)
= (1.55) (Lw) (Atw) +
(4.43) (Atw) +
(K2) (Hw) (N + 1) (√Lw)

C = Height of curb above top of top slab (feet)
Hw = Height of wingwall (feet)
K = Constant value for use in formulas

Slope SL:1	K1	K2
3:1	~	1.054 ~ 7.45
4:1	~	1.031 ~ 8.49
6:1	~	1.014 ~ 10.30

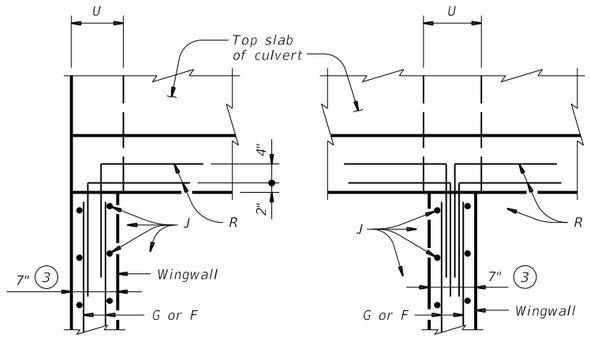
Atw = Anchor toewall length (feet)
Lw = Length of wingwall (feet)
N = Number of culvert barrels
SL:1 = Side slope ratio (horizontal : 1 vertical)

See applicable box culvert standard for H, S, T, and U values.



SECTION A-A

(Showing typical wingwall and wing slab reinforcing. Pipe runners not shown for clarity.)

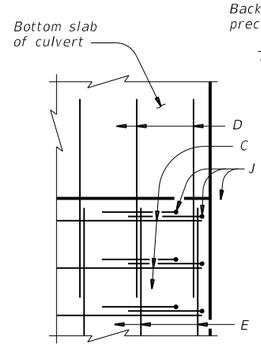


AT TOP OF EXTERIOR WINGWALL

(Cast–in–place culvert)

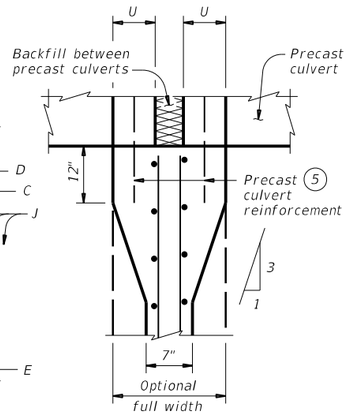
AT TOP OF INTERIOR WINGWALL

(Cast–in–place culvert)



AT OUTSIDE OF BOTTOM SLAB

(Cast–in–place culvert)



AT INTERIOR WINGWALL

(Precast culvert)

PLAN VIEWS OF CORNER DETAILS

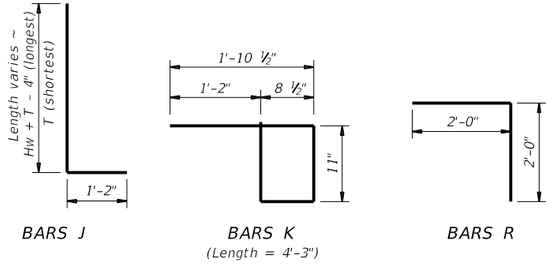
MATERIAL NOTES:

Provide Grade 60 reinforcing steel.
Provide galvanized reinforcing steel if required elsewhere in the plans.
Adjust reinforcing as necessary to provide a minimum clear cover of 1½".
Provide Class "C" concrete (f`c = 3,600 psi).
Provide pipe runners, cross pipes, and anchor pipes meeting the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.
Provide ASTM A307 bolts.
Galvanize all steel components, except the concrete reinforcing, unless required elsewhere in the plans, after fabrication.
Repair galvanizing damaged during transport or construction in accordance with Item 445, "Galvanizing."

GENERAL NOTES:

Designed according to AASHTO LRFD Bridge Design Specifications.
The safety end treatments shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.
Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280–2F, "Safety Treatment of Roadside Parallel–Drainage Structures", Texas Transportation Institute, March 1981.
The quantities for concrete, reinforcing steel, and cross pipes resulting from the formulas given herein are for Contractor's information only.
See the Box Culvert Supplement (BCS) standard sheet for additional dimensions and information.
Alternate design drawings bearing the seal of a professional engineer will be acceptable for precast construction of the safety end treatments.

Cover dimensions are clear dimensions, unless noted otherwise. Reinforcing dimensions are out–to–out of bars.



BARS J | BARS K (Length = 4'–3") | BARS R

TABLE OF REINFORCING BAR SIZES AND SPACING

Bar	Size	Spacing
C	#4	10" Max
D	#4	Match F and E
E	#4	1'– 0" Max
F	#4	1'– 3" Max
G	#6	As shown
J	#4	10" Max
K	#4	1'– 0" Max
R	#4	As shown

(1) *Provide 6:1 or flatter slope.*

(2) *0" Min to 5'–0" Max. Estimated curb heights are shown elsewhere in the plans. For structures without railing and curbs taller than 1'–0", refer to Extended Curb Details the Extended Curb Details (ECD) standard sheet.*

(3) *Wingwall and slab thicknesses may be the same as the adjacent culvert wall and slab thicknesses (7" Minimum). If thicknesses greater than the minimum (7") are used, no changes will be made in quantities and no additional compensation will be allowed.*

(4) *For vehicle safety, reduce height, if necessary, to provide a maximum 3" projection above finished grade. No changes will be made in quantities and no additional compensation will be allowed for this work.*

(5) *For culverts with C = 0", the precast culvert reinforcing may extend 1'–0" minimum into wingwall. Wingwall bars D and R may be omitted. Otherwise, refer to the Wingwall Connection detail on the Box Culvert Precast Miscellaneous Details (SCP–MD) standard sheet.*

Texas Department of Transportation | Bridge Division Standard

SAFETY END TREATMENT

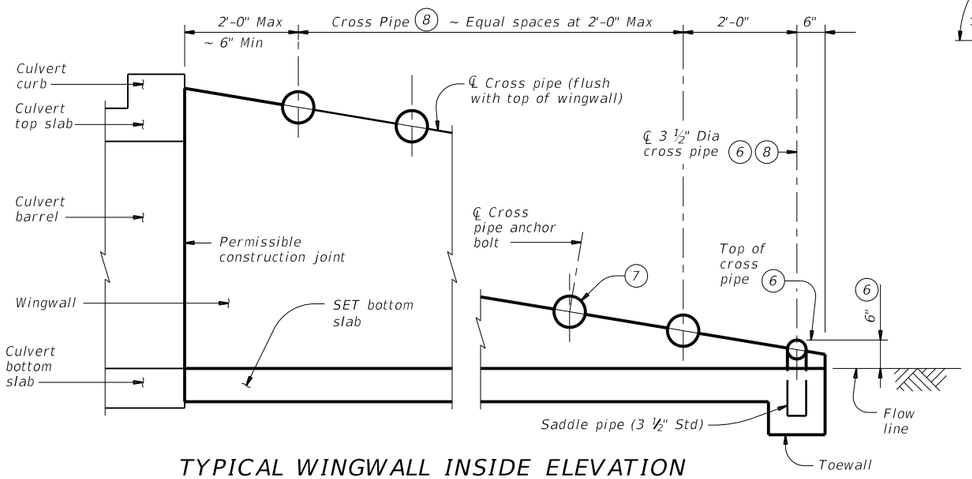
FOR BOX CULVERTS (MAXIMUM Hw = 7'-0") TYPE I ~ PARALLEL DRAINAGE

SETB-PD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		219

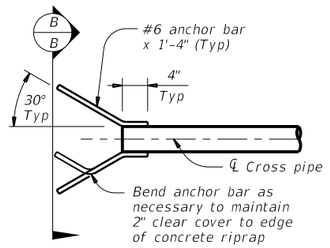
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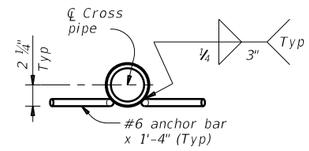


TYPICAL WINGWALL INSIDE ELEVATION

(Showing installation of cross pipes.)

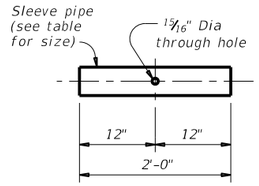


PART PLAN



SECTION B-B

OPTIONAL ANCHOR BAR DETAILS



SLEEVE PIPE DETAILS (9)

REQUIRED PIPE SIZES (8)		
Culvert Span Sizes	Cross Pipe Size	Sleeve Pipe Size (9)
First Pipe	3 ½" STD	2 ½" STD
30" to 42"	4" STD	3" STD
48" to 72"	5" STD	4" STD
78" to 120"	6" STD	5" STD

STANDARD PIPE SIZES		
Pipe Size	Pipe O.D.	Pipe I.D.
2 ½" STD	2.875"	2.469"
3" STD	3.500"	3.068"
3 ½" STD	4.000"	3.548"
4" STD	4.500"	4.026"
5" STD	5.563"	5.047"
6" STD	6.625"	6.065"

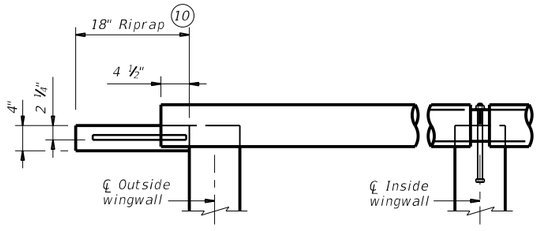
(6) The proper installation of the first cross pipe is critical for vechicle saftey. Place the top of the first cross pipe at no more than 6" above the flow line.

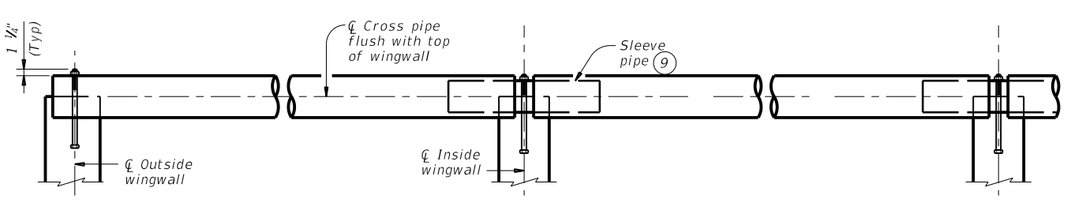
(7) Always install the third cross pipe from the bottom of the culvert using a bolted connection. Take care to ensure that concrete does not flow into this cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(8) Provide cross pipes and sleeve pipes (if required) as shown in the Required Pipe Sizes table. Provide 3 1#2" saddle pipes for the 3 1#2" first cross pipe.

(9) At Contractor's option, make the cross pipe continuous across the inside wingwalls. If this option is selected, omit the sleeve pipe and make a 15#16" diameter throughhole in the cross pipe to accept the anchor bolt at the centerline of each interior wingwall.

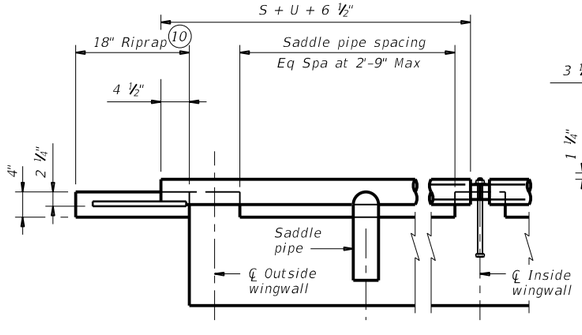
(10) Provide riprap when using the Optional Anchor Bar details. Riprap is included in the bid price for Safety End Treatment. Provide riprap in accordance with Item 432, "Riprap".

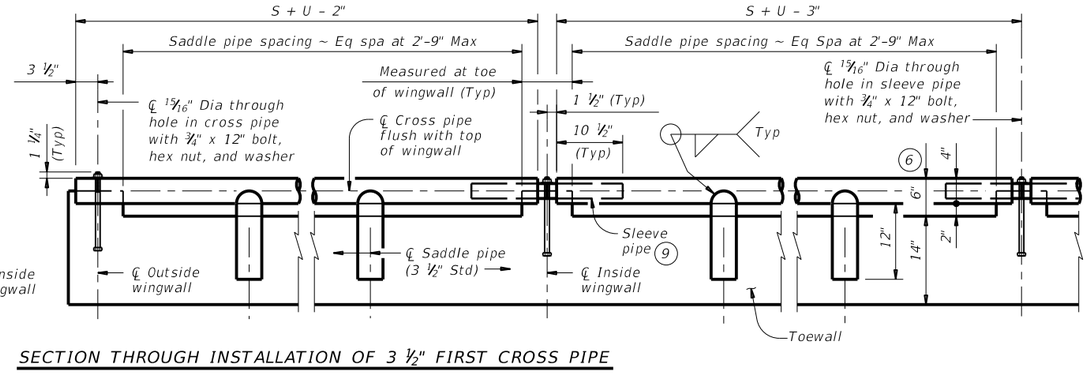




SECTION THROUGH INSTALLATION OF TYPICAL FULL CROSS PIPE

(Anchor details and dimensions are similar to those shown below in Section Through Installation of 3 ½" First Cross Pipe detail.)





SECTION THROUGH INSTALLATION OF 3 ½" FIRST CROSS PIPE

OUTSIDE CULVERT BARREL WITH OPTIONAL ANCHOR BARS & RIPRAP

OUTSIDE CULVERT BARREL WITH BOLTED ANCHOR

INSIDE CULVERT BARREL

CROSS PIPE INSTALLATION DETAILS

SHEET 2 OF 2

Texas Department of Transportation

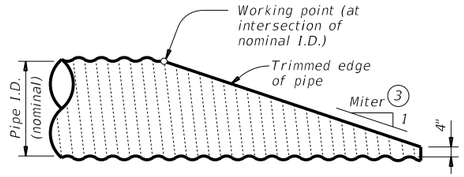
Bridge Division Standard

SAFETY END TREATMENT

FOR BOX CULVERTS
(MAXIMUM Hw = 7'-0")
TYPE I ~ PARALLEL DRAINAGE

SETB-PD

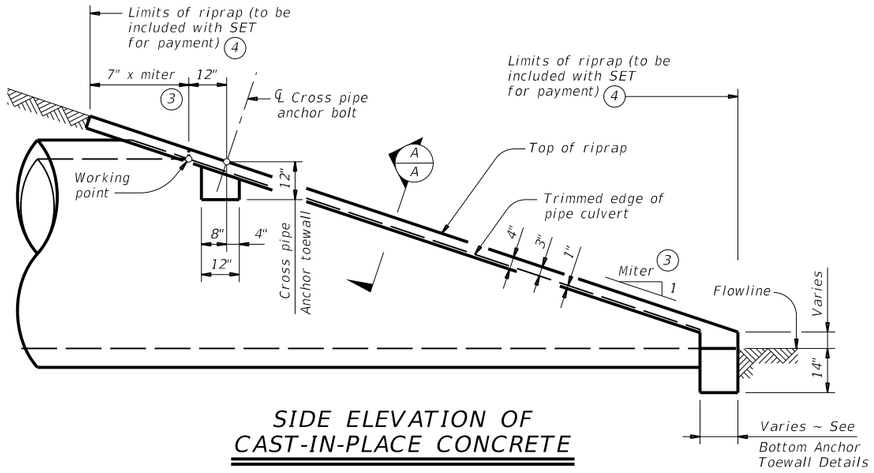
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REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		220



NOTE: All pipe runners, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

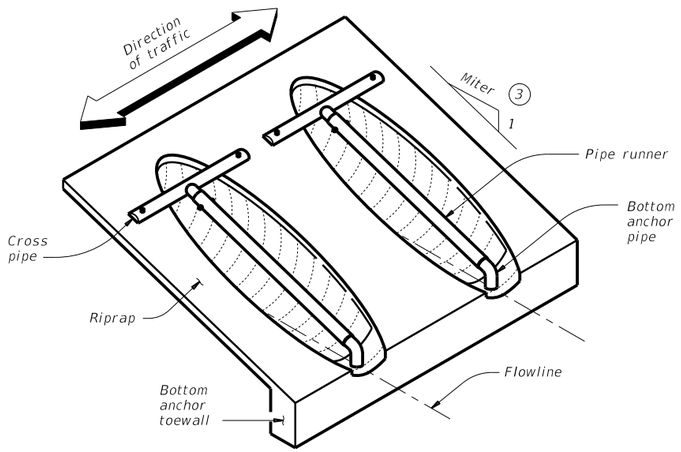
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert.
Details of reinforced concrete pipe (RCP) culvert are similar.)



SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert.
Details of corrugated metal pipe (CMP) culvert
are similar. Pipe runners not shown for clarity)



ISOMETRIC VIEW OF TYPICAL INSTALLATION

(Showing installation with no skew.)

CROSS PIPE LENGTHS AND PIPE RUNNER LENGTHS (1) (2)

Nominal Culvert I.D.	Pipe Culvert Spa ~ G	Cross Pipe Length	Pipe Runner Length											
			3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
			0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
24"	1' – 7"	3' – 5"	N/A	N/A	N/A	5' – 10"	N/A	N/A	N/A	8' – 1"	N/A	N/A	N/A	12' – 9"
27"	1' – 8"	3' – 8"	N/A	N/A	5' – 5"	6' – 11"	N/A	N/A	7' – 7"	9' – 7"	N/A	N/A	11' – 11"	14' – 11"
30"	1' – 10"	3' – 11"	N/A	N/A	6' – 4"	8' – 0"	N/A	N/A	8' – 9"	11' – 0"	N/A	N/A	13' – 8"	17' – 0"
33"	1' – 11"	4' – 2"	6' – 2"	6' – 5"	7' – 3"	9' – 1"	8' – 6"	8' – 10"	10' – 0"	12' – 5"	13' – 3"	13' – 9"	15' – 5"	19' – 2"
36"	2' – 1"	4' – 5"	6' – 11"	7' – 3"	8' – 2"	10' – 2"	9' – 6"	9' – 11"	11' – 2"	13' – 10"	14' – 9"	15' – 3"	17' – 2"	21' – 3"
42"	2' – 4"	4' – 11"	8' – 6"	8' – 10"	9' – 11"	12' – 4"	11' – 7"	12' – 0"	13' – 6"	16' – 8"	17' – 9"	18' – 5"	20' – 8"	25' – 7"
48"	2' – 7"	5' – 5"	10' – 1"	10' – 5"	11' – 9"	N/A	13' – 7"	14' – 2"	15' – 10"	N/A	20' – 9"	21' – 6"	24' – 2"	N/A
54"	3' – 0"	5' – 11"	11' – 8"	12' – 1"	N/A	N/A	15' – 8"	16' – 3"	N/A	N/A	23' – 10"	24' – 8"	N/A	N/A
60"	3' – 3"	6' – 5"	13' – 3"	N/A	N/A	N/A	17' – 9"	N/A	N/A	N/A	26' – 10"	N/A	N/A	N/A

TYPICAL PIPE CULVERT MITERS (3)

Side Slope	0° Skew	15° Skew	30° Skew	45° Skew
3:1	3:1	3.106:1	3.464:1	4.243:1
4:1	4:1	4.141:1	4.619:1	5.657:1
6:1	6:1	6.212:1	6.928:1	8.485:1

CONDITIONS WHERE PIPE RUNNERS ARE NOT REQUIRED (2)

Nominal Culvert I.D.	Single Pipe Culvert	Multiple Pipe Culverts
12" thru 21"	Skews thru 45°	Skews thru 45°
24"	Skews thru 45°	Skews thru 30°
27"	Skews thru 30°	Skews thru 15°
30"	Skews thru 15°	Skews thru 15°
33"	Skews thru 15°	Always required
36"	Normal (no skew)	Always required
42" thru 60"	Always required	Always required

STANDARD PIPE SIZES AND MAX PIPE RUNNER LENGTHS (1)

Pipe Size	Pipe O.D.	Pipe I.D.	Max Pipe Runner Length
2" STD	2.375"	2.067"	N/A
3" STD	3.500"	3.068"	10' – 0"
4" STD	4.500"	4.026"	19' – 8"
5" STD	5.563"	5.047"	34' – 2"

ESTIMATED CONCRETE RIPRAP QUANTITIES (CY) (5)

Nominal Culvert I.D.	3:1 Side Slope				4:1 Side Slope				6:1 Side Slope			
	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew	0° Skew	15° Skew	30° Skew	45° Skew
12"	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.7	0.8
15"	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9
18"	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	1.0
21"	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1.0	1.2
24"	0.6	0.7	0.7	0.8	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.3
27"	0.7	0.7	0.8	0.9	0.8	0.9	0.9	1.1	1.1	1.1	1.2	1.4
30"	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.2	1.2	1.2	1.3	1.6
33"	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.3	1.3	1.4	1.5	1.7
36"	0.9	0.9	0.9	1.1	1.1	1.1	1.2	1.4	1.4	1.5	1.6	1.8
42"	1.0	1.0	1.1	1.3	1.2	1.3	1.3	1.6	1.6	1.7	1.8	2.1
48"	1.1	1.1	1.2	N/A	1.4	1.4	1.5	N/A	1.9	1.9	2.1	N/A
54"	1.3	1.3	N/A	N/A	1.6	1.6	N/A	N/A	2.1	2.1	N/A	N/A
60"	1.4	N/A	N/A	N/A	1.7	N/A	N/A	N/A	2.3	N/A	N/A	N/A

(1) Provide pipe runner of the size shown in the tables. Provide cross pipe of the same size as the pipe runner. Provide cross pipe stub out and bottom anchor pipe of the next smaller size pipe as shown in the Standard Pipe Sizes and Max Pipe Runner Lengths table.

(2) This standard allows for the placement of only one pipe runner across each culvert pipe opening. In order to limit the clear opening to be traversed by an errant vehicle, the following conditions must be met:

For 60" culvert pipes, the skew must not exceed 0°.
For 54" culvert pipes, the skew must not exceed 15°.
For 48" culvert pipes, the skew must not exceed 30°.
For all culvert pipe sizes 42" and less, the skew must not exceed 45°.

If the above conditions cannot be met, the designer should consider using a safety end treatment with flared wings. For further information, refer to the TxDOT Roadway Design Manual.

(3) Miter = slope of mitered end of pipe culvert.

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(5) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for Contractor's information only.

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SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

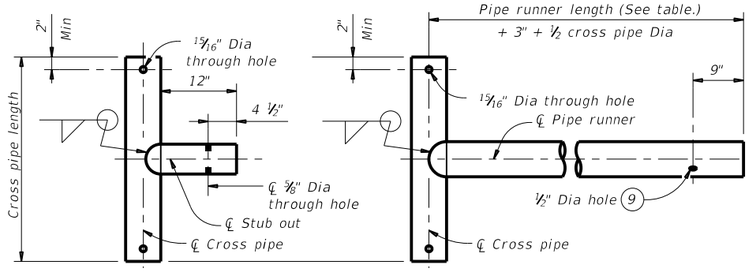
FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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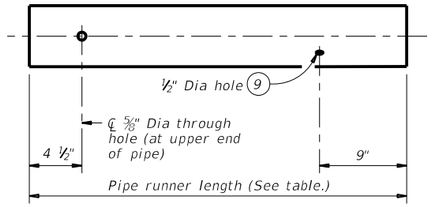
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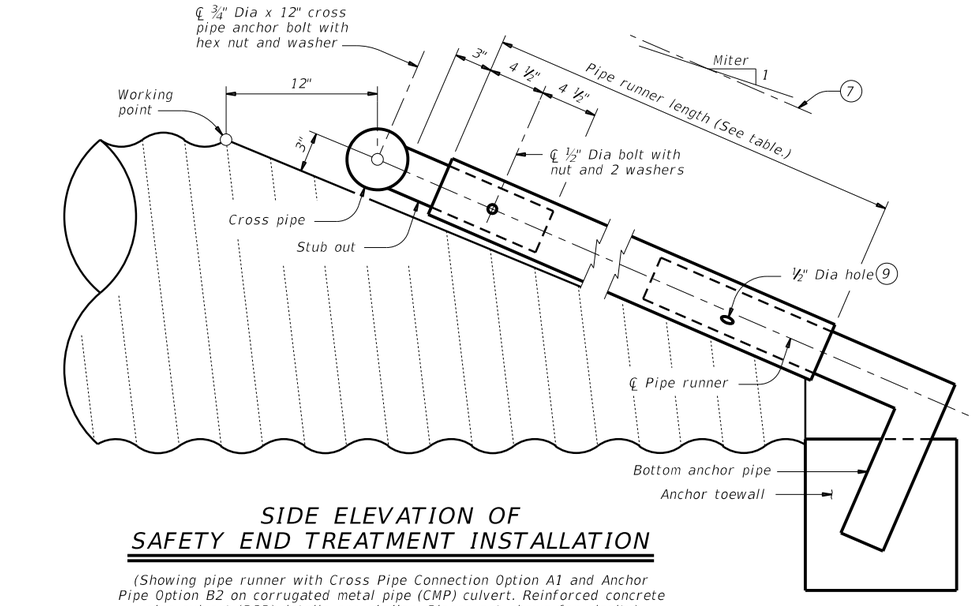
OPTION A1 OPTION A2

CROSS PIPE AND CONNECTIONS DETAILS



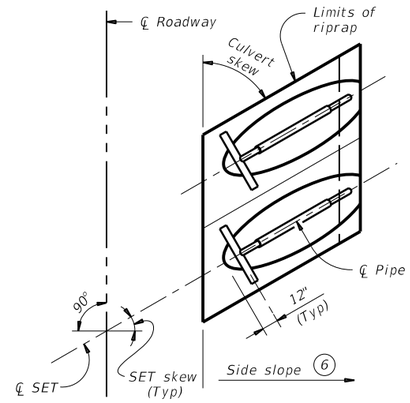
NOTE: The separate pipe runner shown is required when Cross Pipe Connection Option A1 is used.

PIPE RUNNER DETAILS

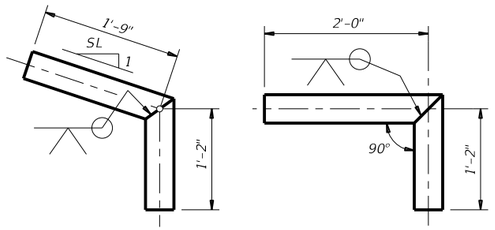


SIDE ELEVATION OF SAFETY END TREATMENT INSTALLATION

(Showing pipe runner with Cross Pipe Connection Option A1 and Anchor Pipe Option B2 on corrugated metal pipe (CMP) culvert. Reinforced concrete pipe culvert (RCP) details are similar. Riprap not shown for clarity)

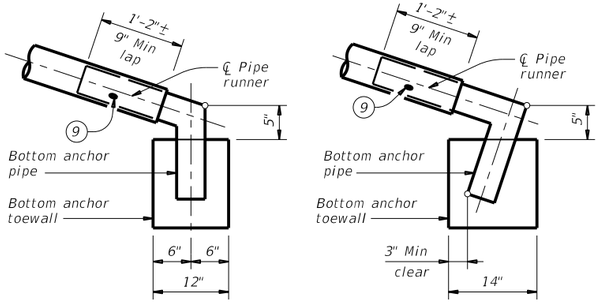


PLAN OF SKEWED INSTALLATION



OPTION B1 OPTION B2

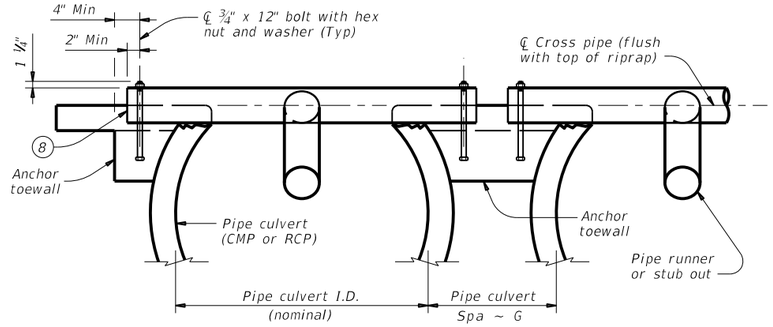
BOTTOM ANCHOR PIPE DETAILS (10)



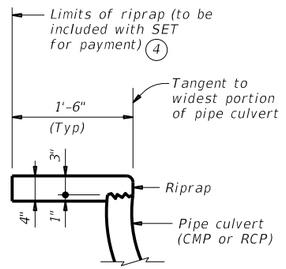
OPTION B1 OPTION B2

BOTTOM ANCHOR TOEWALL DETAILS

(Culvert and riprap not shown for clarity.)



SHOWING CROSS PIPE AND ANCHOR TOEWALL



SHOWING TYPICAL PIPE CULVERT AND RIPRAP

SECTION A-A

(4) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Recommended values of side slope are 3:1, 4:1, and 6:1. All quantities, calculations, and dimensions shown herein are based on these recommended values. Slope of 3:1 or flatter is required for vehicle safety.

(7) Note that actual slope of pipe runner may vary slightly from side slope of riprap and trimmed culvert pipe edge.

(8) Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access.

(9) After installation, inspect the 1/2" hole to ensure that the lap of the pipe runner with the bottom anchor pipe is adequate.

(10) At fabricator's option, a heat bend to a smooth 5" radius or a manufactured elbow (of the same material as the runner) may be substituted for the mitered and welded joint in the bottom anchor pipe.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide pipe runners, cross pipes, and anchor pipes conforming to the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 Gr B, or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication.

Repair galvanizing damaged during transport or construction in accordance with the specifications.

GENERAL NOTES:

Pipe runners are designed for a traversing load of 1,800 pounds at yield as recommended by Research Report 280-1, "Safety Treatment of Roadside Cross-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the pipe runners.

Payment for riprap and toewall is included in the price bid for each safety end treatment.

Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Texas Department of Transportation

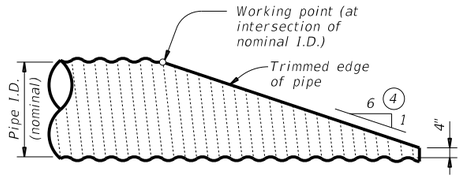
Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 60" DIA
PIPE CULVERTS
TYPE II ~ CROSS DRAINAGE

SETP-CD

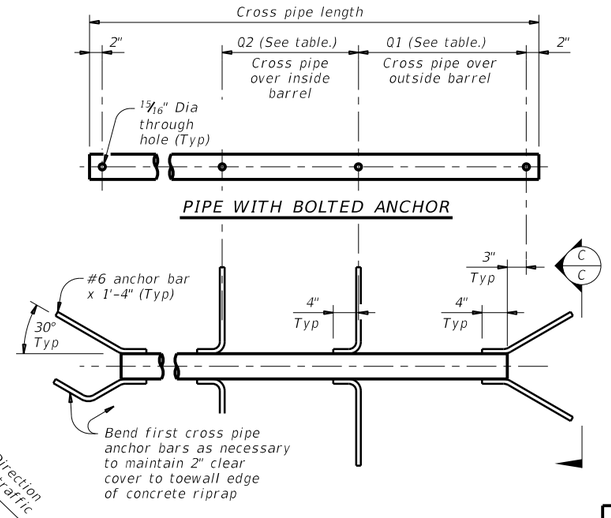
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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		222



NOTE: All cross pipes, calculations, and dimensions are based on the pipe culverts mitered as shown in this detail. Alternate styles of mitered ends will require that appropriate adjustments be made to the values presented on this standard.

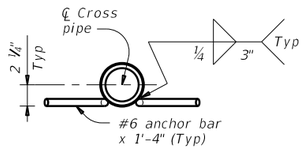
SIDE ELEVATION OF TYPICAL PIPE CULVERT MITER

(Showing corrugated metal pipe (CMP) culvert Details at reinforced concrete pipe (RCP) culvert are similar.)



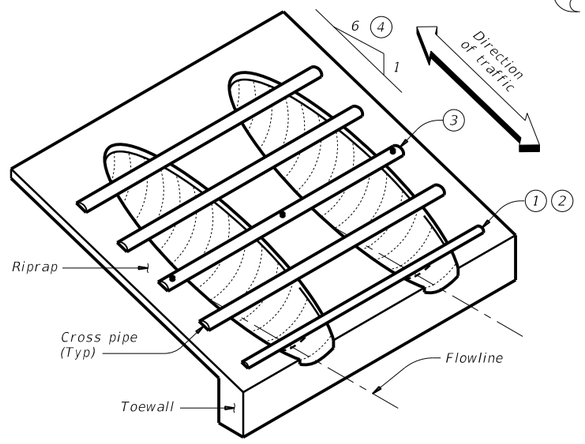
PIPE WITH BOLTED ANCHOR

PIPE WITH ANCHOR BARS

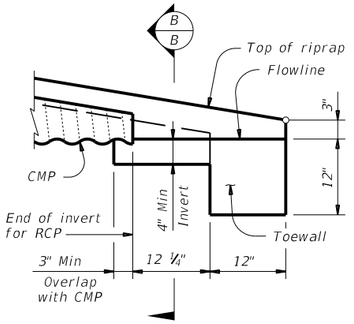


SECTION C-C

CROSS PIPE DETAILS

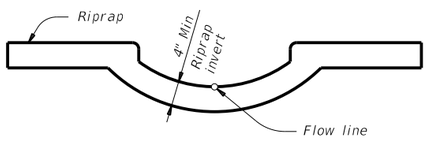


ISOMETRIC VIEW OF TYPICAL INSTALLATION



DETAIL "A"

(Showing invert with corrugated metal pipe (CMP) culvert. Reinforced concrete pipe (RCP) culvert details are similar. Cross pipes not shown for clarity.)



SECTION B-B

(Cross pipes not shown for clarity.)

CROSS PIPE LENGTHS, REQUIRED PIPE SIZES, AND RIPRAP QUANTITIES (2)

Nominal Culvert I.D.	Conc Riprap (CY) (6)	Pipe Culvert Spa ~ G	Single Barrel ~ Q1	Multi-Barrel ~ Q1	Q2	Conditions for Use of Cross Pipes	Cross Pipe Sizes
12"	0.6	0' – 9"	N/A	2' – 1"	1' – 9"	3 or more pipe culverts	3" Std (3.500" O.D.)
15"	0.7	0' – 11"	N/A	2' – 5"	2' – 2"		
18"	0.8	1' – 2"	N/A	2' – 10"	2' – 8"		
21"	0.9	1' – 4"	N/A	3' – 2"	3' – 1"		
24"	0.9	1' – 7"	N/A	3' – 6"	3' – 7"		
27"	1.0	1' – 8"	N/A	3' – 10"	3' – 11"	3 or more pipe culverts	3 1/2" Std (4.000" O.D.)
30"	1.1	1' – 10"	N/A	4' – 2"	4' – 4"	2 or more pipe culverts	
33"	1.2	1' – 11"	4' – 2"	4' – 5"	4' – 8"	All pipe culverts	
36"	1.3	2' – 1"	4' – 5"	4' – 9"	5' – 1"	All pipe culverts	4" Std (4.500" O.D.)
42"	1.5	2' – 4"	4' – 11"	5' – 5"	5' – 10"		
48"	1.7	2' – 7"	5' – 5"	6' – 0"	6' – 7"	All pipe culverts	5" Std (5.563" O.D.)
54"	2.0	3' – 0"	5' – 11"	6' – 9"	7' – 6"		
60"	2.2	3' – 3"	6' – 5"	7' – 4"	8' – 3"		
66"	2.4	3' – 3"	6' – 11"	7' – 10"	8' – 9"		
72"	2.7	3' – 4"	7' – 5"	8' – 5"	9' – 4"		

(1) The proper installation of the first cross pipe is critical for vehicle safety. Place the top of the first cross pipe no more than 6" above the flow line.

(2) Provide cross pipes, except the first bottom pipe, of the size shown in the table. Provide a 3 1#2" standard pipe (4" O.D.) for the first bottom pipe.

(3) Install the third cross pipe from the bottom of the culvert using a bolted connection. Ensure that riprap concrete does not flow into the cross pipe so as to permit disassembly of the bolted connection to allow cleanout access. At the Contractor's option, install all other cross pipes using the bolted connection details.

(4) Match cross slope as shown elsewhere in the plans. Cross slope of 6:1 or flatter is required for vehicle safety.

(5) Riprap placed beyond the limits shown will be paid for as concrete riprap in accordance with Item 432, "Riprap".

(6) Quantities shown are for one end of one reinforced concrete pipe (RCP) culvert. For multiple pipe culverts or for corrugated metal pipe (CMP) culverts, quantities will need to be adjusted. Riprap quantities are for contractor's information only.

MATERIAL NOTES:

Synthetic fibers listed on the "Fibers for Concrete" Material Producer List (MPL) may be used in lieu of steel reinforcing in riprap concrete unless noted otherwise.

Provide cross pipes that meet the requirements of ASTM A53 (Type E or S, Gr B), ASTM A500 (Gr B), or API 5LX52.

Provide ASTM A307 bolts and nuts.

Galvanize all steel components, except concrete reinforcing, after fabrication. Repair galvanizing damaged during transport or construction in accordance with the specifications.

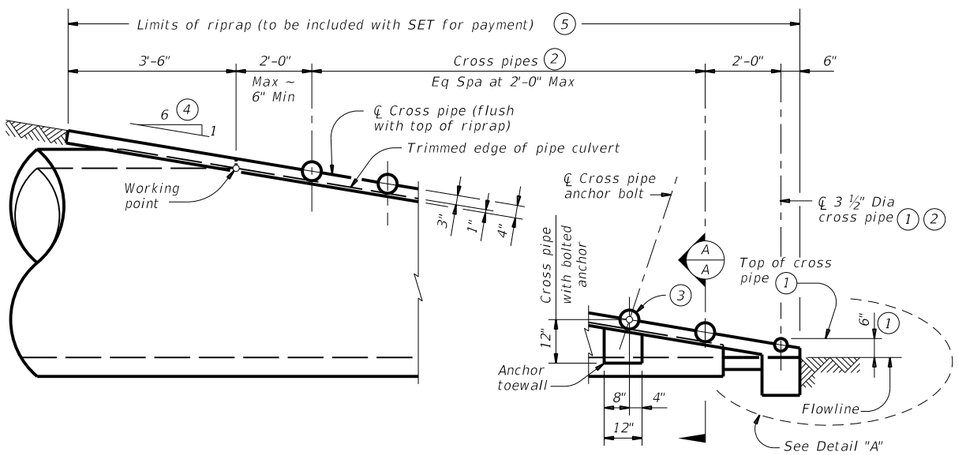
GENERAL NOTES:

Cross pipes are designed for a traversing load of 10,000 pounds at yield as recommended by Research Report 280-2F, "Safety Treatment of Roadside Parallel-Drainage Structures", Texas Transportation Institute, March 1981.

Safety end treatments (SET) shown herein are intended for use in those installations where out of control vehicles are likely to traverse the openings approximately perpendicular to the cross pipes.

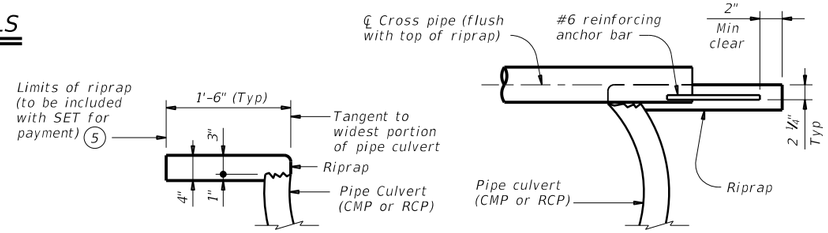
Construct concrete riprap and all necessary inverts in accordance with the requirements of Item 432, "Riprap".

Payment for riprap and toewall is included in the Price Bid for each Safety End Treatment.



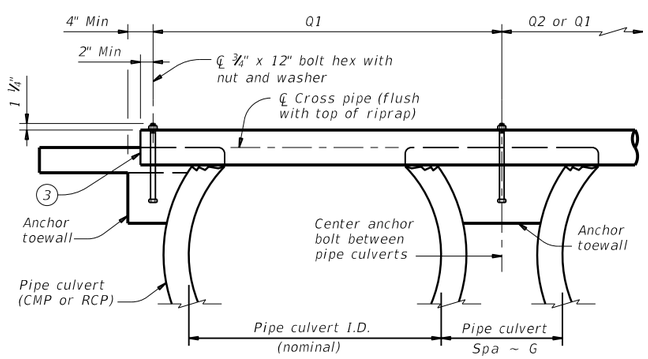
SIDE ELEVATION OF CAST-IN-PLACE CONCRETE

(Showing reinforced concrete pipe (RCP) culvert. Details at corrugated metal pipe (CMP) culvert are similar.)



SHOWING CROSS PIPE WITH ANCHOR BAR

SHOWING TYPICAL PIPE CULVERT AND RIPRAP



SHOWING CROSS PIPE WITH BOLTED ANCHOR

SECTION A-A

Texas Department of Transportation

Bridge Division Standard

SAFETY END TREATMENT

FOR 12" DIA TO 72" DIA PIPE CULVERTS TYPE II ~ PARALLEL DRAINAGE

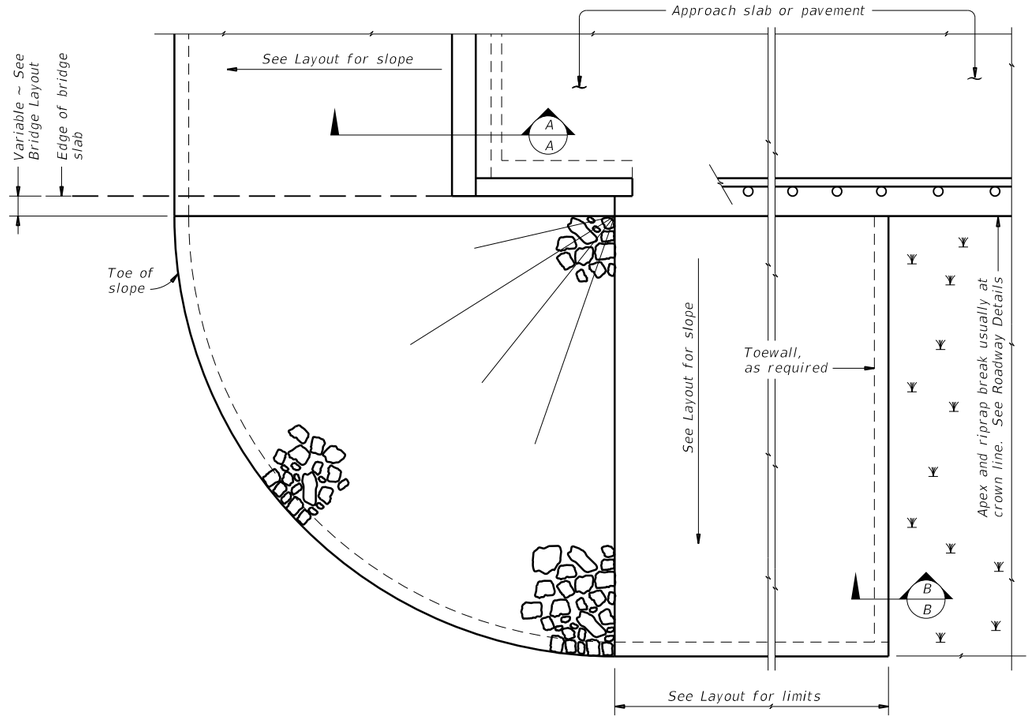
SETP-PD

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©TxDOT February 2020	CONT	SECT	JOB	HIGHWAY
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	AUS	HAYS		223

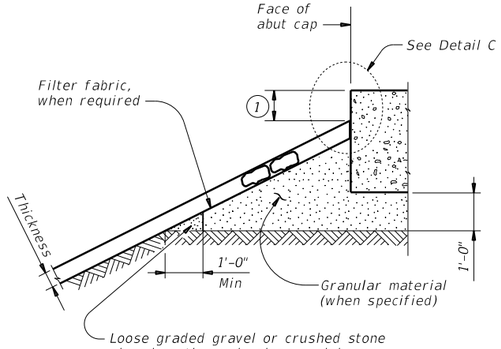
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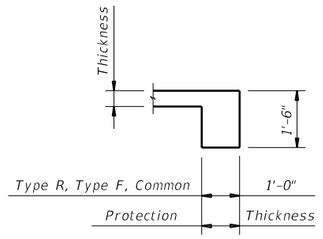
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PLAN

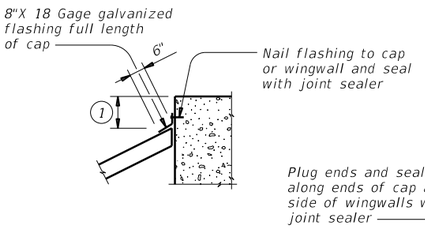


SECTION A-A AT CAP

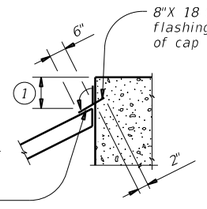


SECTION B-B

Provide toewall when shoulder drain is located adjacent to limits of stone riprap. Omit toewall when thickness of protection riprap is greater than 18".

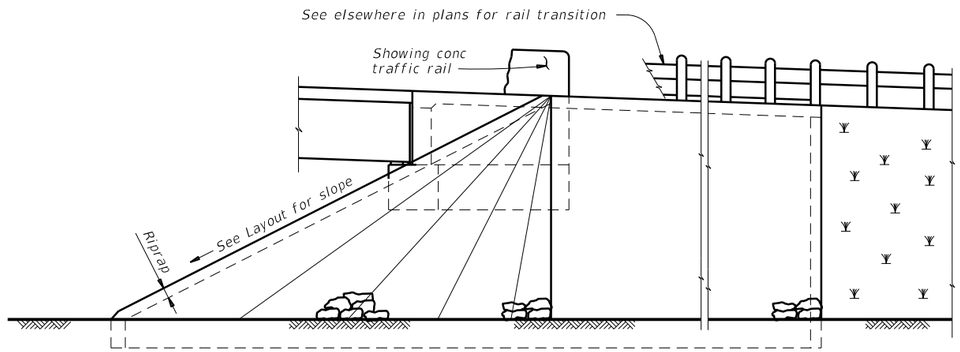


CAP OPTION A



CAP OPTION B

DETAIL C



ELEVATION

(1) Top of cap to top of riprap dimension varies as directed by the Engineer. Provide 9" Min for beam/slab type bridges and 1'-6" for slab span, box beam, or slab beam bridges.

GENERAL NOTES:
Refer to Item 432, "Riprap" for stone size and gradation, and construction details. See Layout for limits and thickness of riprap specified.
See elsewhere in plans for locations and details of shoulder drains.

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FILE: c:\pwworkdir\bgepw-projects\mhancock\dms05983\SRR.dgn

SHEET 1 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

SRR

FILE: srrstde1-19.dgn	DN: AES	CK: JGD	DW: BWH	CK: AES		
©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY		
REVISIONS				HILLSIDE TER		
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	AUS	HAYS		224		

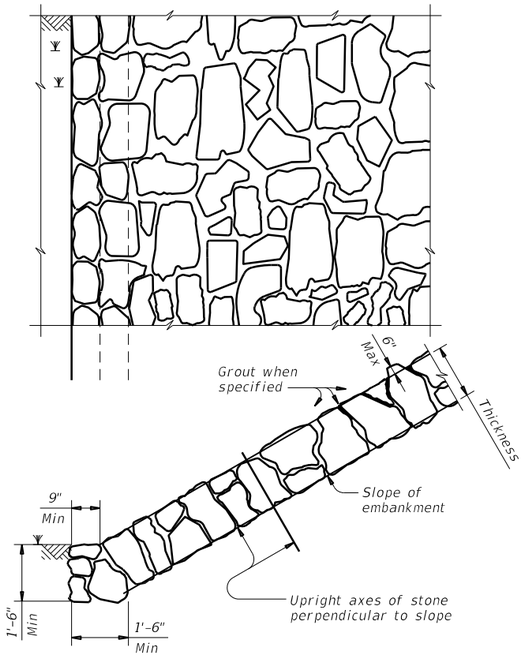


FIGURE 1 ~ TYPE R STONE RIPRAP

dry or grouted

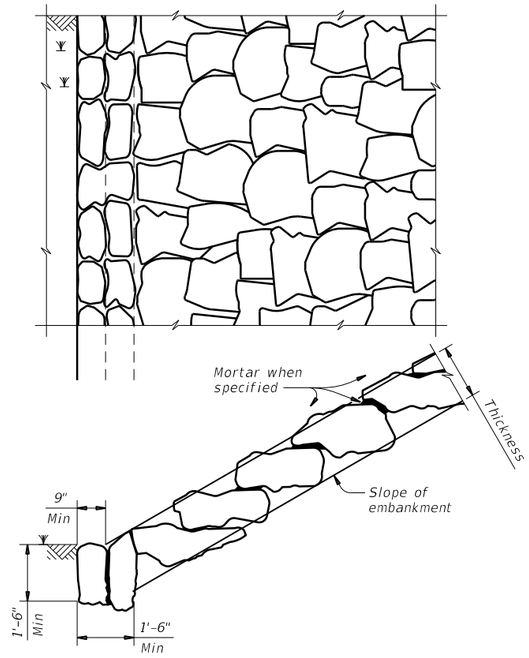


FIGURE 2 ~ TYPE F STONE RIPRAP

dry or mortared

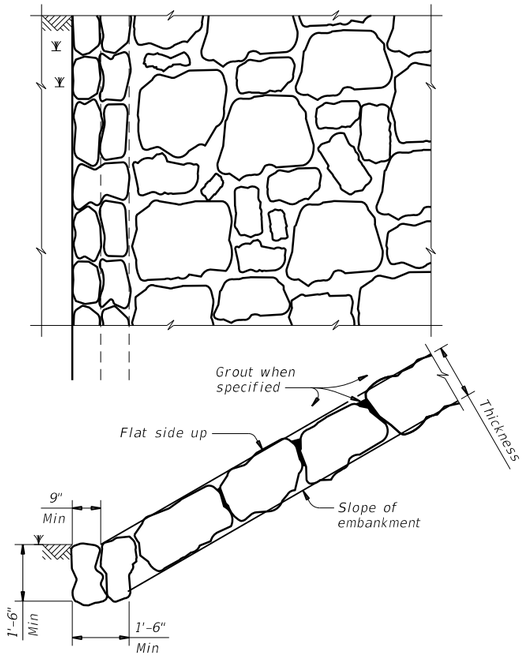


FIGURE 3 ~ TYPE F STONE RIPRAP

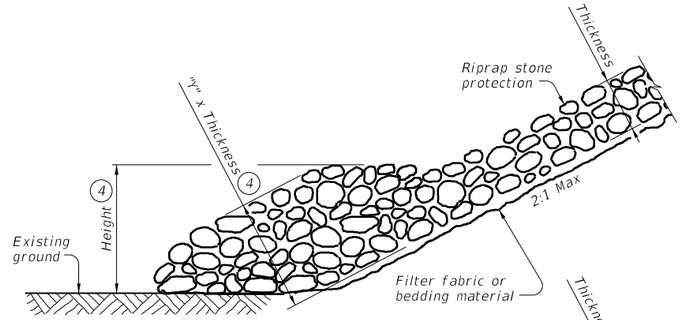
grouted

2 Provide bedding material instead of filter fabric if shown elsewhere in plans. See Layout for thickness of bedding material.

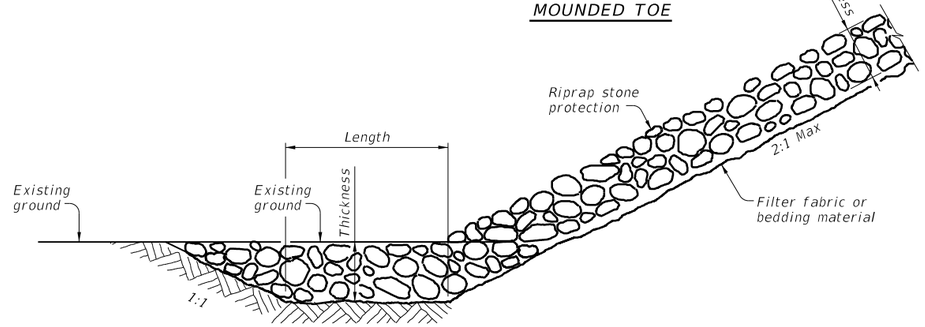
3 Minimum toe depth is the larger of the maximum scour depth or 2 times the riprap thickness.

4 "Y" and Height need to be defined. See layout or detail sheet for values if this option is used.

5 List Stone Protection as size (XX inch) and thickness (YY inch) on the layout.
Example: Riprap (Stone Protection) XX inch, Thickness = YY inch.



MOUNDED TOE



EXTENDED ROCK FILLED TRENCH

PROTECTION STONE RIPRAP TOE OPTIONS 5

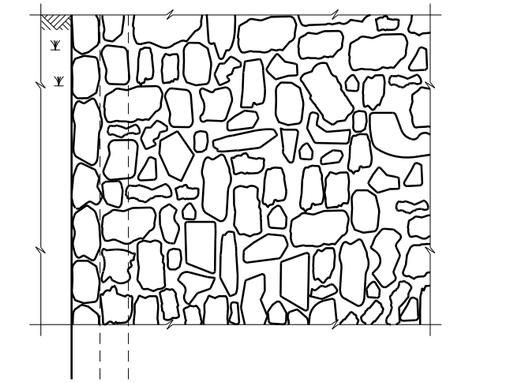


FIGURE 4 ~ COMMON STONE RIPRAP

dry or grouted

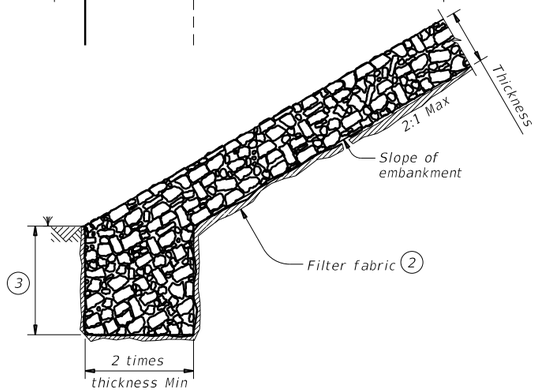


FIGURE 5 ~ PROTECTION STONE RIPRAP 5

SHEET 2 OF 2

Texas Department of Transportation

Bridge Division Standard

STONE RIPRAP

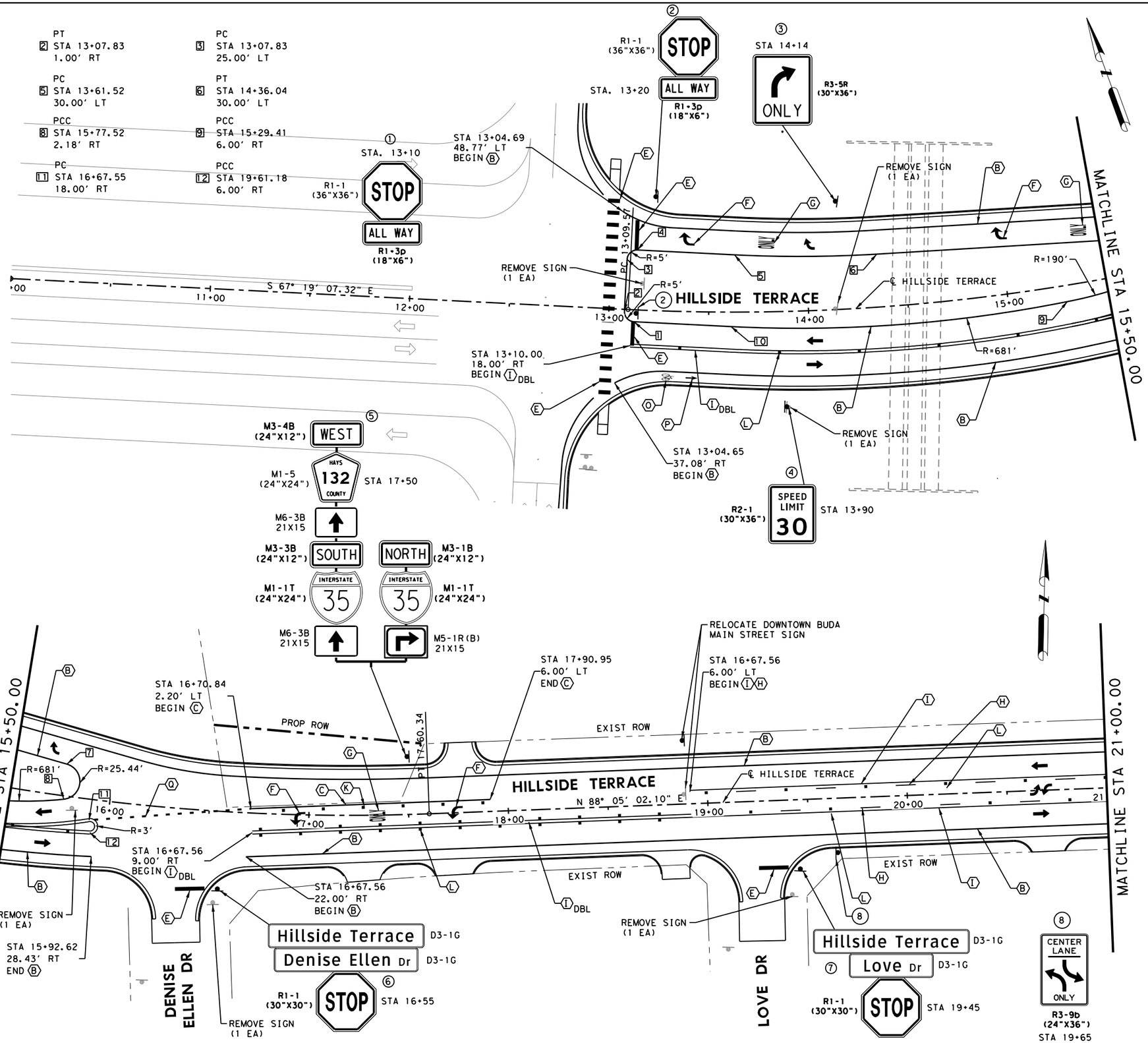
SRR

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©TxDOT April 2019	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		225

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DATE: 1/27/2023 2:15:53 PM
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PT 4 STA 13+12.83 30.00' LT	PC 5 STA 13+61.52 30.00' LT	PT 6 STA 14+36.04 30.00' LT
PC 7 STA 15+77.87 15.49' LT	PCC 8 STA 15+77.52 2.18' RT	PCC 9 STA 15+29.41 6.00' RT
PT 10 STA 13+61.52 6.00' RT	PC 11 STA 16+67.55 18.00' RT	PCC 12 STA 19+61.18 6.00' RT



LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

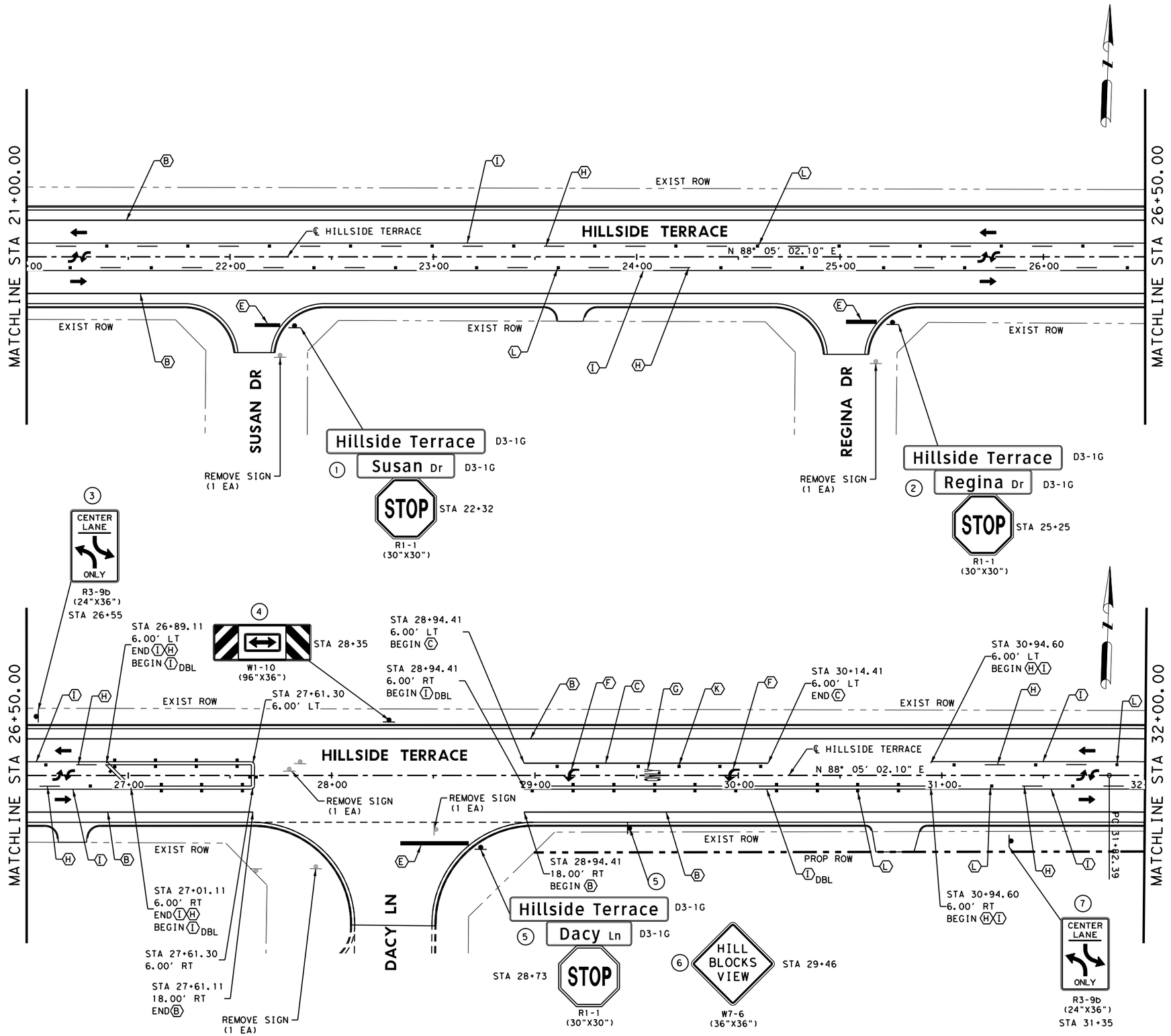
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 1 OF 11
DRAWN BY:		226
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:16:03 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms05987\HST+SPMD+01.dgn



LEGEND

Ⓐ	W 6" BRK
Ⓑ	W 6" SOLID
Ⓒ	W 8" SOLID
Ⓓ	W 12" SOLID
Ⓔ	W 24" SOLID
Ⓕ	W ARROW
Ⓖ	W WORD
Ⓗ	Y 6" BRK
Ⓘ	Y 6" SOLID
Ⓙ	Y 12" SOLID
Ⓚ	TY I-C
Ⓛ	TY II-A-A
Ⓜ	Y 24" SOLID
Ⓝ	W DBL ARROW
Ⓞ	W BIKE SYMBOL
Ⓟ	W BIKE ARROW
Ⓠ	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

1/27/2023

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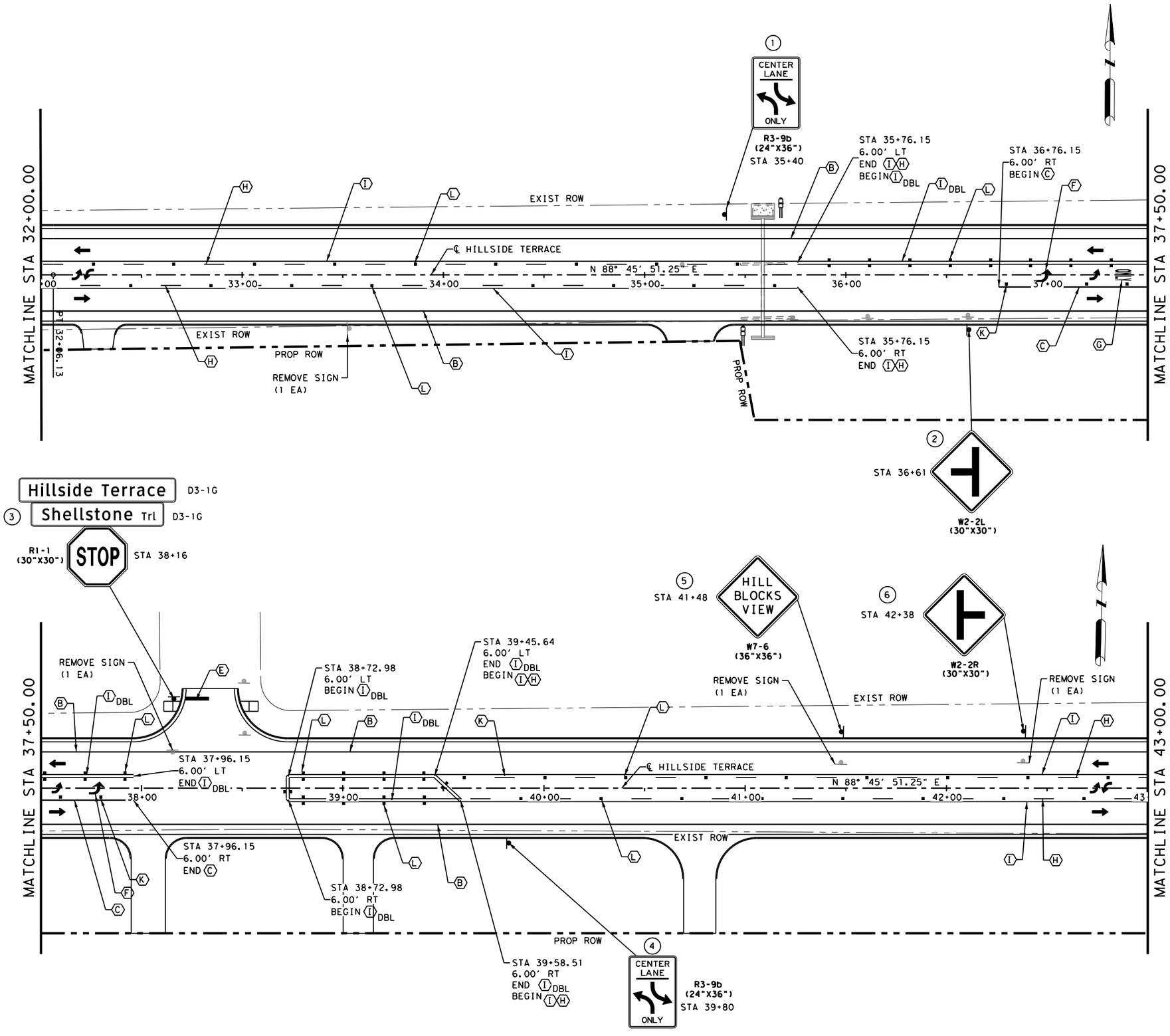
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 2 OF 11
DRAWN BY:		227
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:16:12 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms05987\HST+SPMD+02.dgn



LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

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1/27/2023

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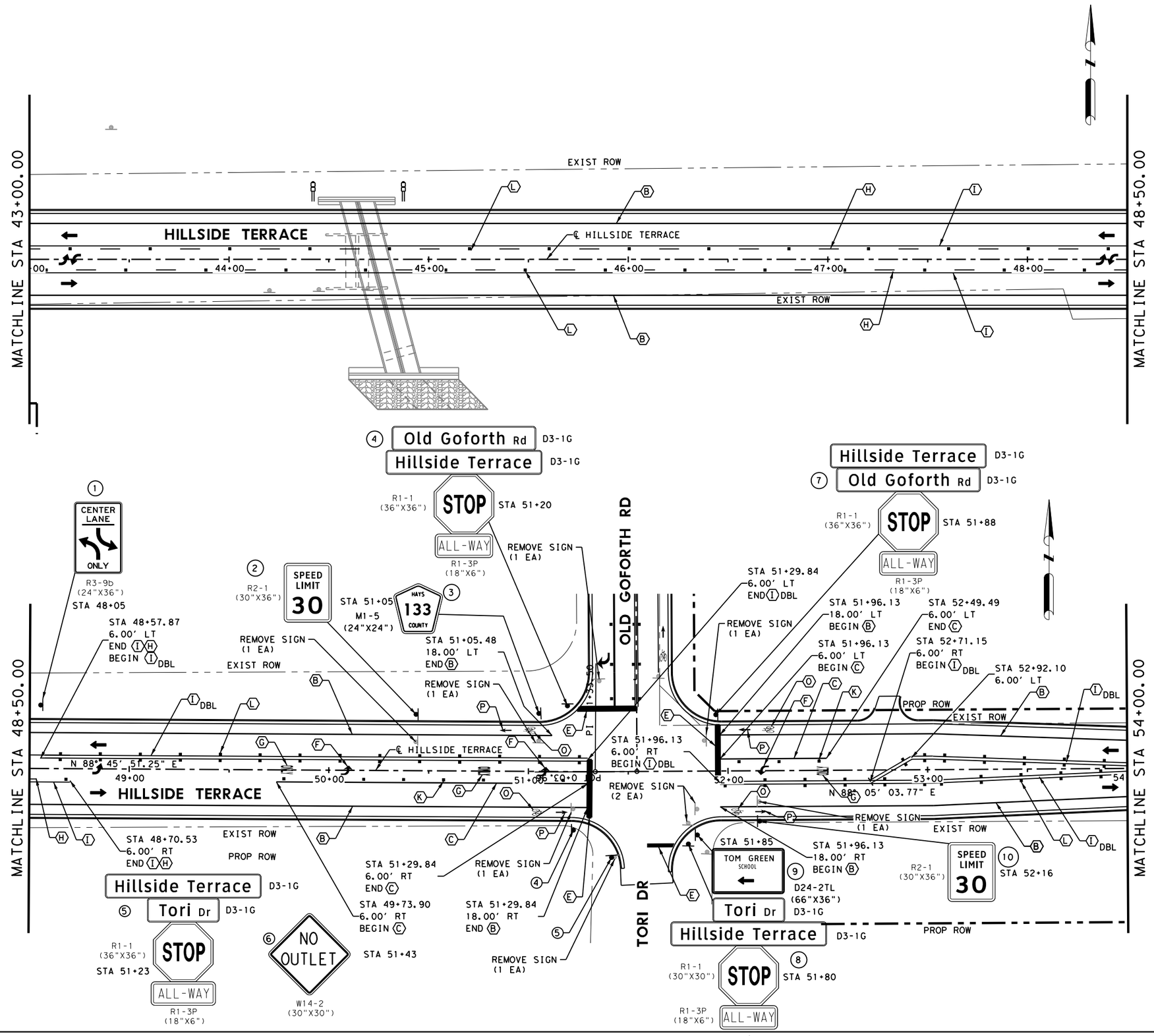
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 3 OF 11
DRAWN BY:		228
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:16:17 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms0598?\HST*SPMD*03.dgn



LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

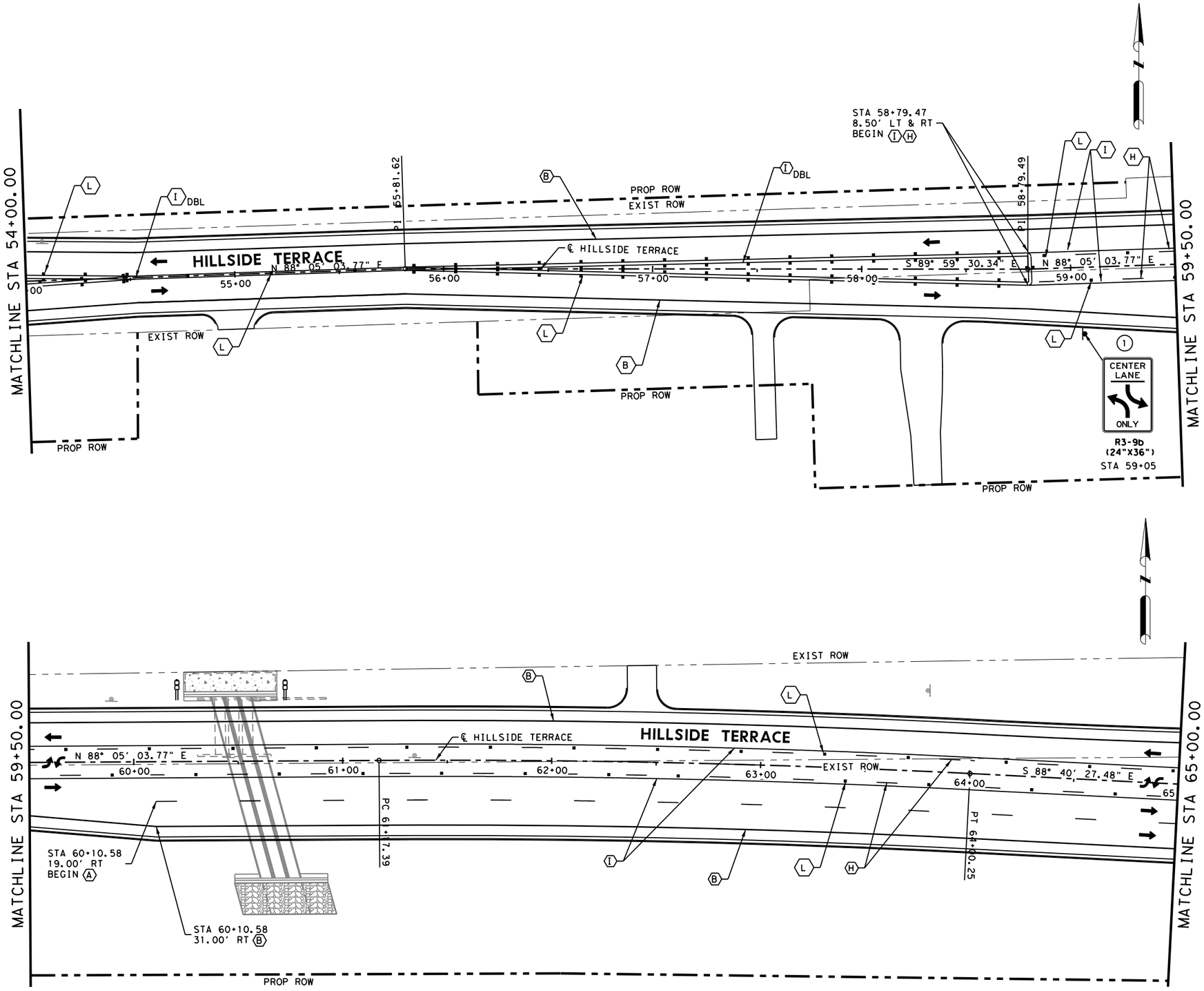
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 4 OF 11
DRAWN BY:		229
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:16:22 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms0598?\HST*SPMD*04.dgn



LEGEND

(A)	W 6" BRK
(B)	W 6" SOLID
(C)	W 8" SOLID
(D)	W 12" SOLID
(E)	W 24" SOLID
(F)	W ARROW
(G)	W WORD
(H)	Y 6" BRK
(I)	Y 6" SOLID
(J)	Y 12" SOLID
(K)	TY I-C
(L)	TY II-A-A
(M)	Y 24" SOLID
(N)	W DBL ARROW
(O)	W BIKE SYMBOL
(P)	W BIKE ARROW
(Q)	W 6" DOT

OBJECT MARKER (OM-2X)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

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Under the authority of:

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NO.	DATE	REVISION	APPROVED

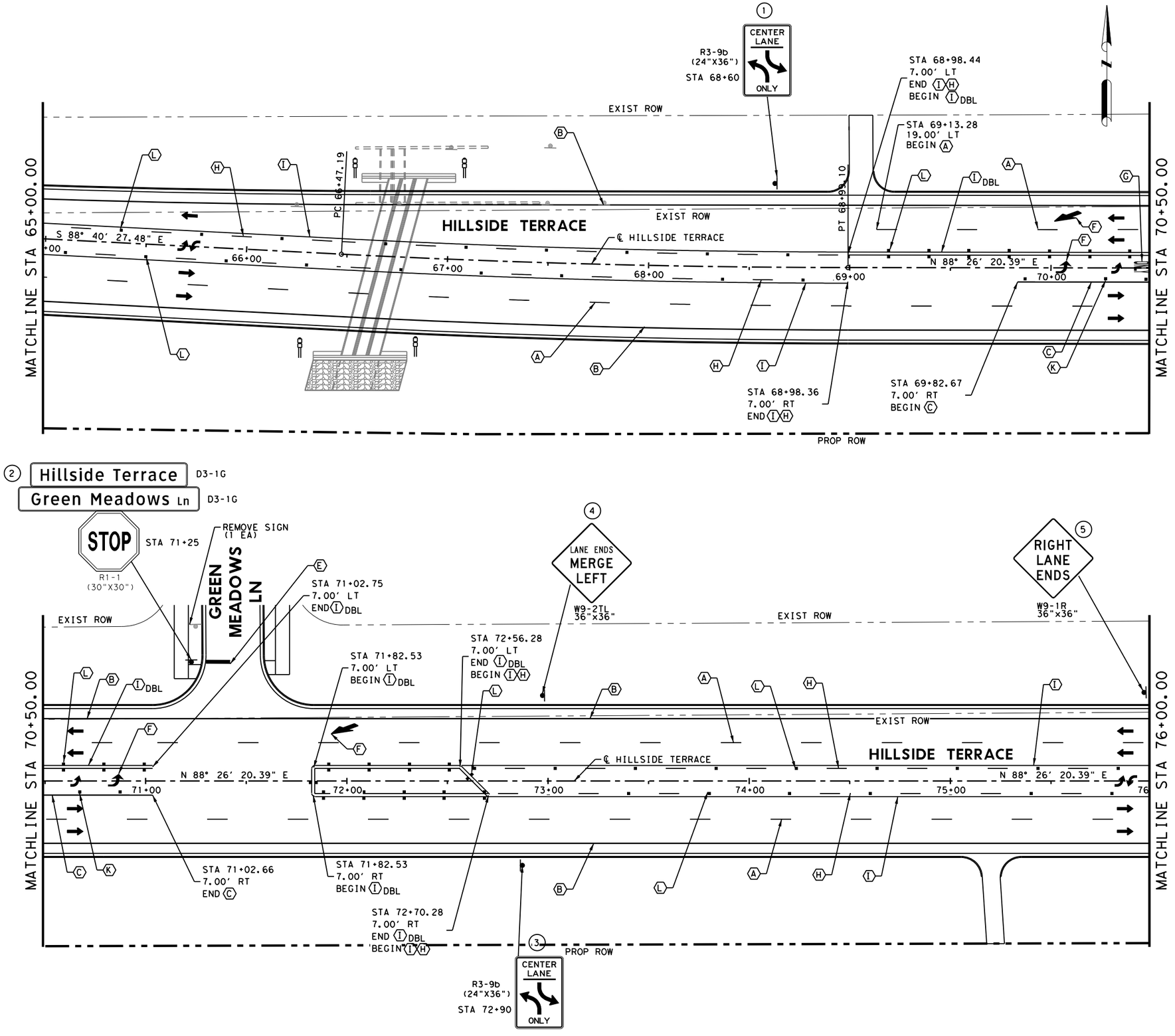
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 5 OF 11
DRAWN BY:		230
CHECKED BY:		
APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\dms05987\HST*SPMD*05.dgn



LEGEND

Ⓐ	W 6" BRK
Ⓑ	W 6" SOLID
Ⓒ	W 8" SOLID
Ⓓ	W 12" SOLID
Ⓔ	W 24" SOLID
Ⓕ	W ARROW
Ⓖ	W WORD
Ⓗ	Y 6" BRK
Ⓘ	Y 6" SOLID
Ⓙ	Y 12" SOLID
Ⓚ	TY I-C
Ⓛ	TY II-A-A
Ⓜ	Y 24" SOLID
Ⓝ	W DBL ARROW
Ⓞ	W BIKE SYMBOL
Ⓟ	W BIKE ARROW
Ⓠ	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

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1/27/2023

NO.	DATE	REVISION	APPROVED

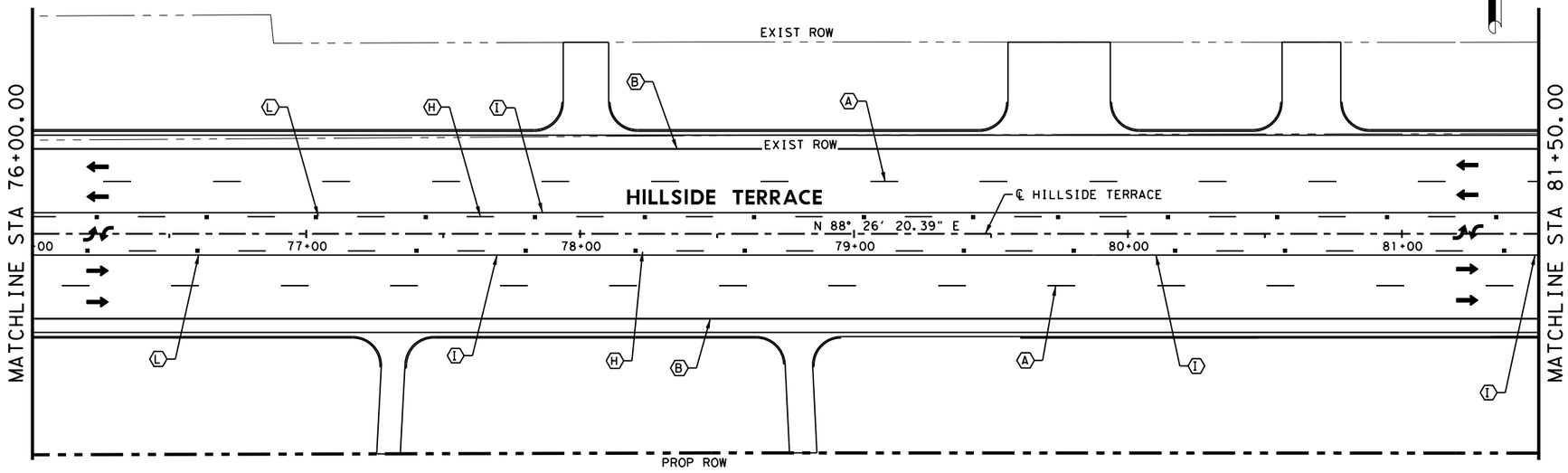
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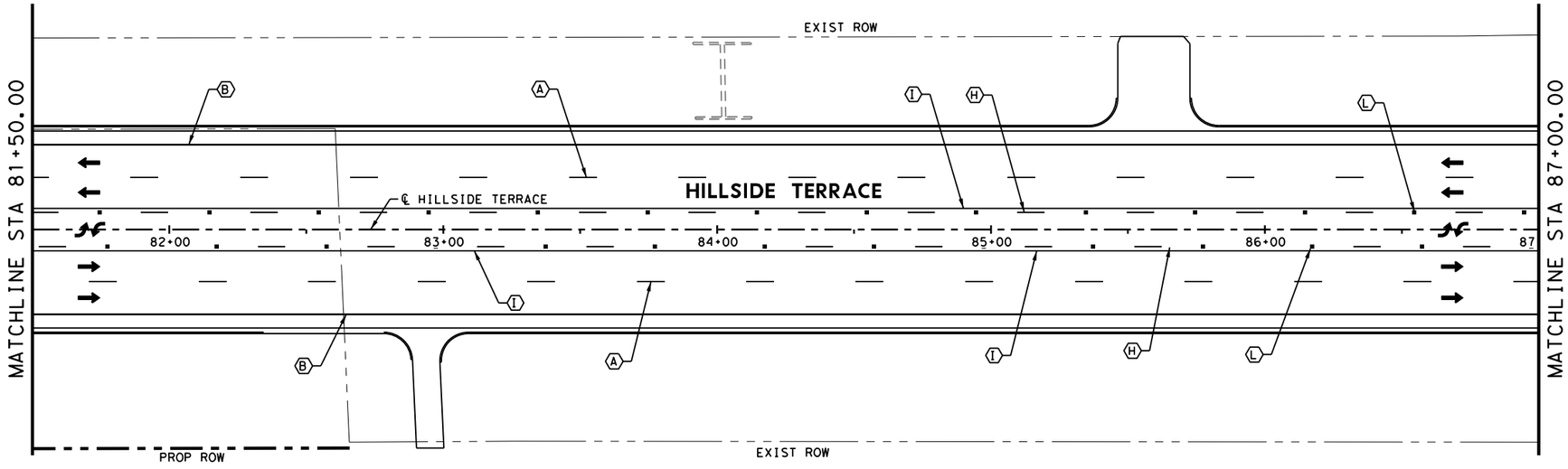
HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 6 OF 11
DRAWN BY:		
CHECKED BY:		231
APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\dms0598?\HST*SPMD*06.dgn





LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

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NO.	DATE	REVISION	APPROVED

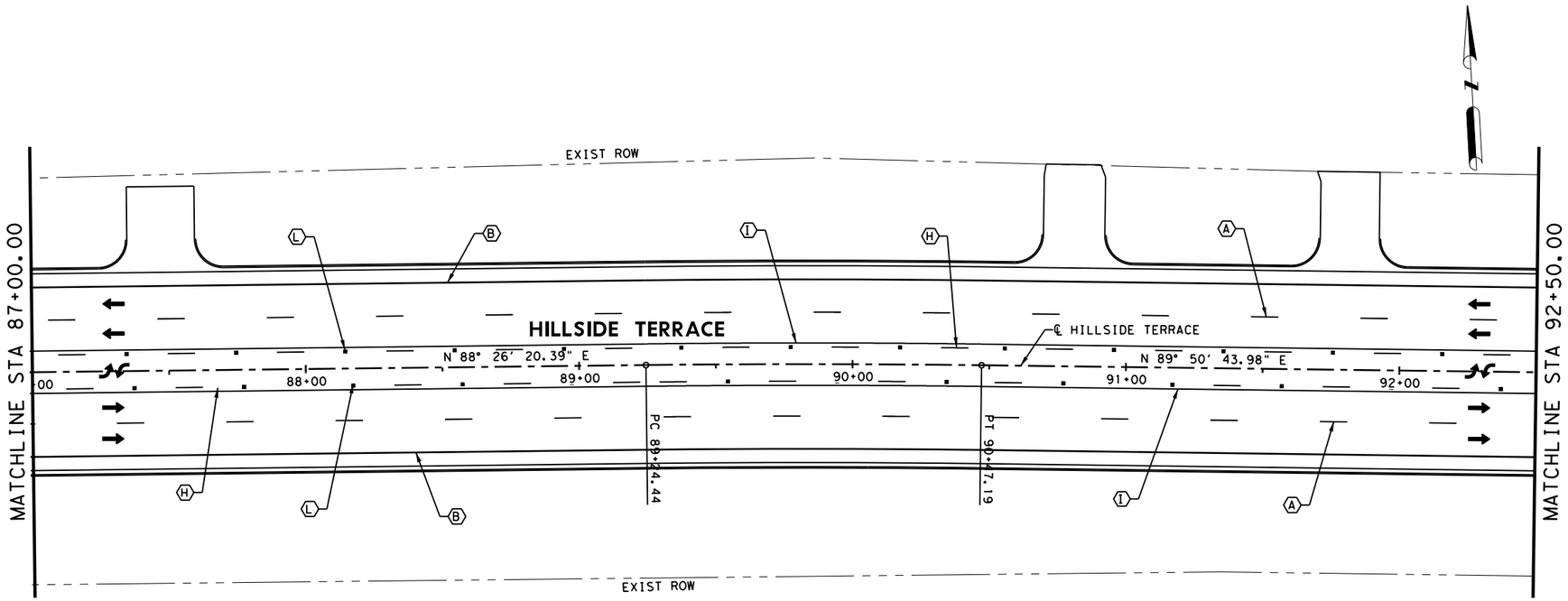
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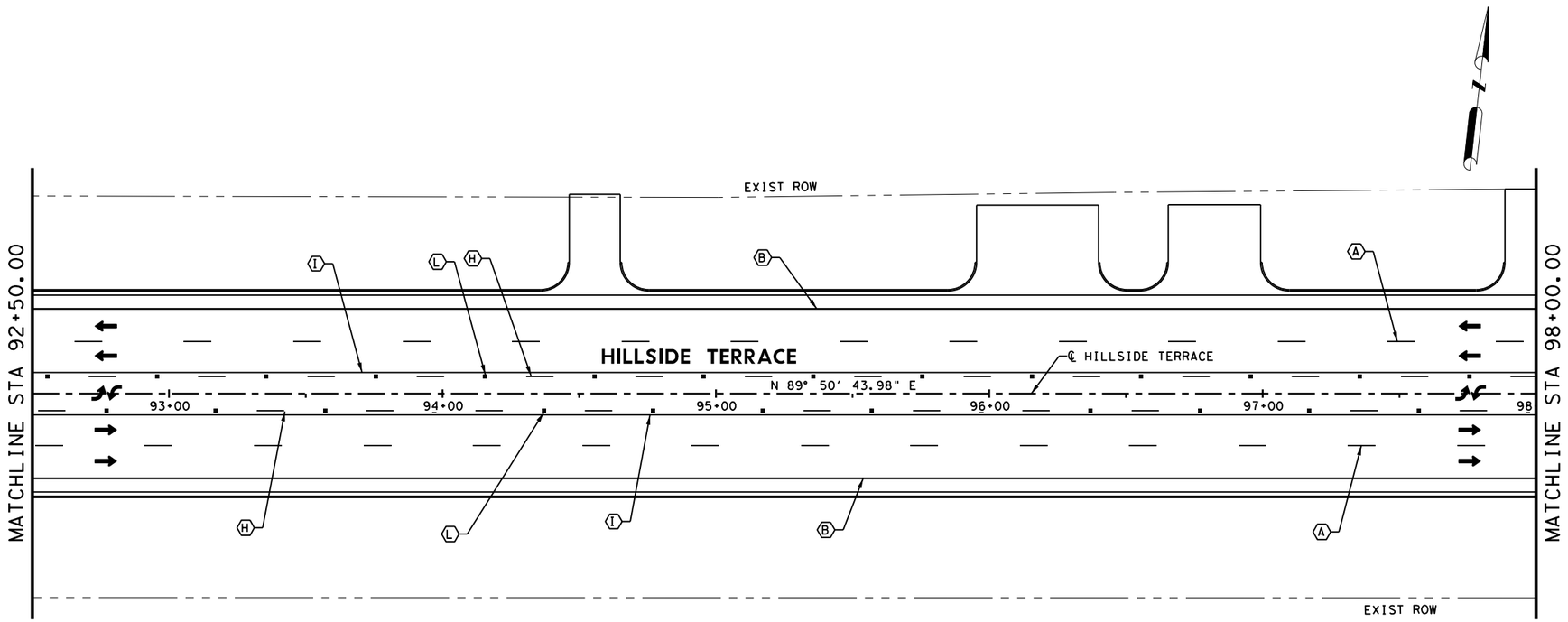
HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 7 OF 11
DRAWN BY:		
CHECKED BY:		232
APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\ms05987\HST*SPMD*07.dgn





LEGEND

(A)	W 6" BRK
(B)	W 6" SOLID
(C)	W 8" SOLID
(D)	W 12" SOLID
(E)	W 24" SOLID
(F)	W ARROW
(G)	W WORD
(H)	Y 6" BRK
(I)	Y 6" SOLID
(J)	Y 12" SOLID
(K)	TY I-C
(L)	TY II-A-A
(M)	Y 24" SOLID
(N)	W DBL ARROW
(O)	W BIKE SYMBOL
(P)	W BIKE ARROW
(Q)	W 6" DOT

OBJECT MARKER (OM-2X)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

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HAYS COUNTY STATE OF TEXAS

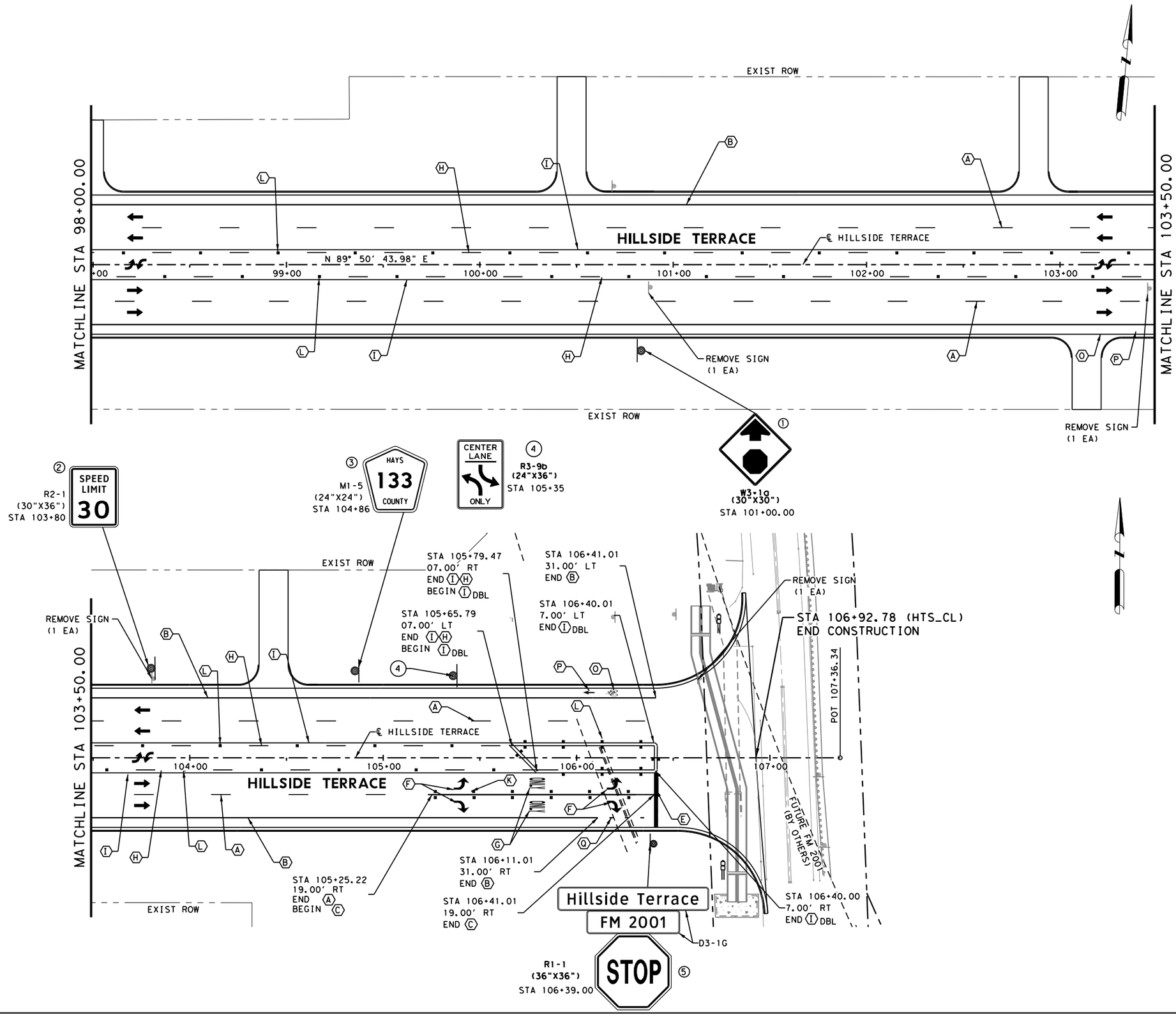
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 8 OF 11
DRAWN BY:		233
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APPROVED BY:		

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c:\pwworkdir\bgepw-projects\mhancock\dms05987\HST*SPMD*08.dgn



LEGEND

(A)	W 6" BRK
(B)	W 6" SOLID
(C)	W 8" SOLID
(D)	W 12" SOLID
(E)	W 24" SOLID
(F)	W ARROW
(G)	W WORD
(H)	Y 6" BRK
(I)	Y 6" SOLID
(J)	Y 12" SOLID
(K)	TY I-C
(L)	TY II-A-A
(M)	Y 24" SOLID
(N)	W DBL ARROW
(O)	W BIKE SYMBOL
(P)	W BIKE ARROW
(Q)	W 6" DOT

OBJECT MARKER (OM-2X)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

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Under the authority of:

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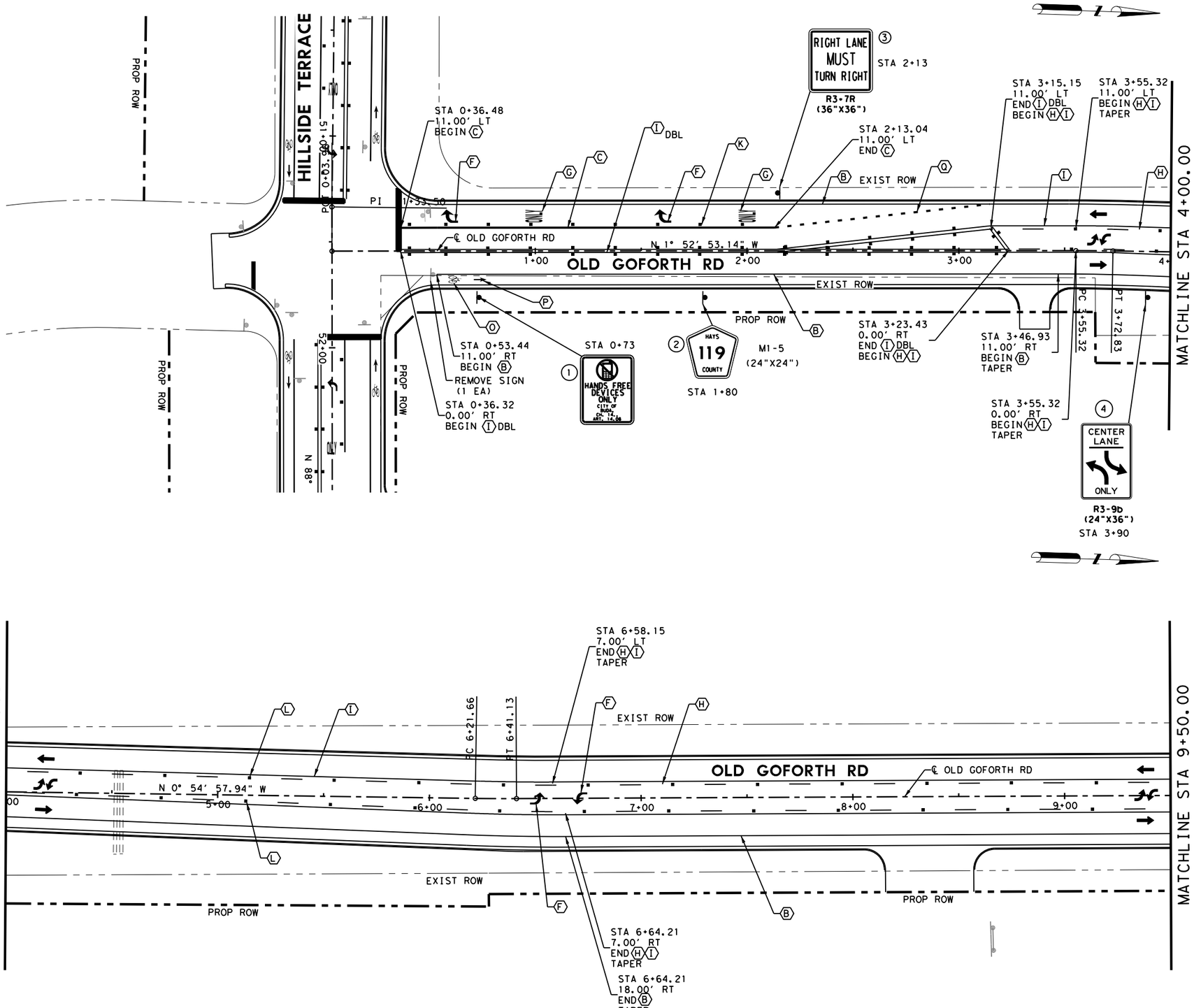
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 9 OF 11
DRAWN BY:		234
CHECKED BY:		
APPROVED BY:		

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LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X) (WC) (GND)

PROPOSED SIGN POST

DELINEATOR (D-SW) (SZ1) (BRF) (GF2) (BI)

DELINEATOR (D-SW) (SZ) (BRF) (CTB) (BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

HAYS COUNTY STATE OF TEXAS

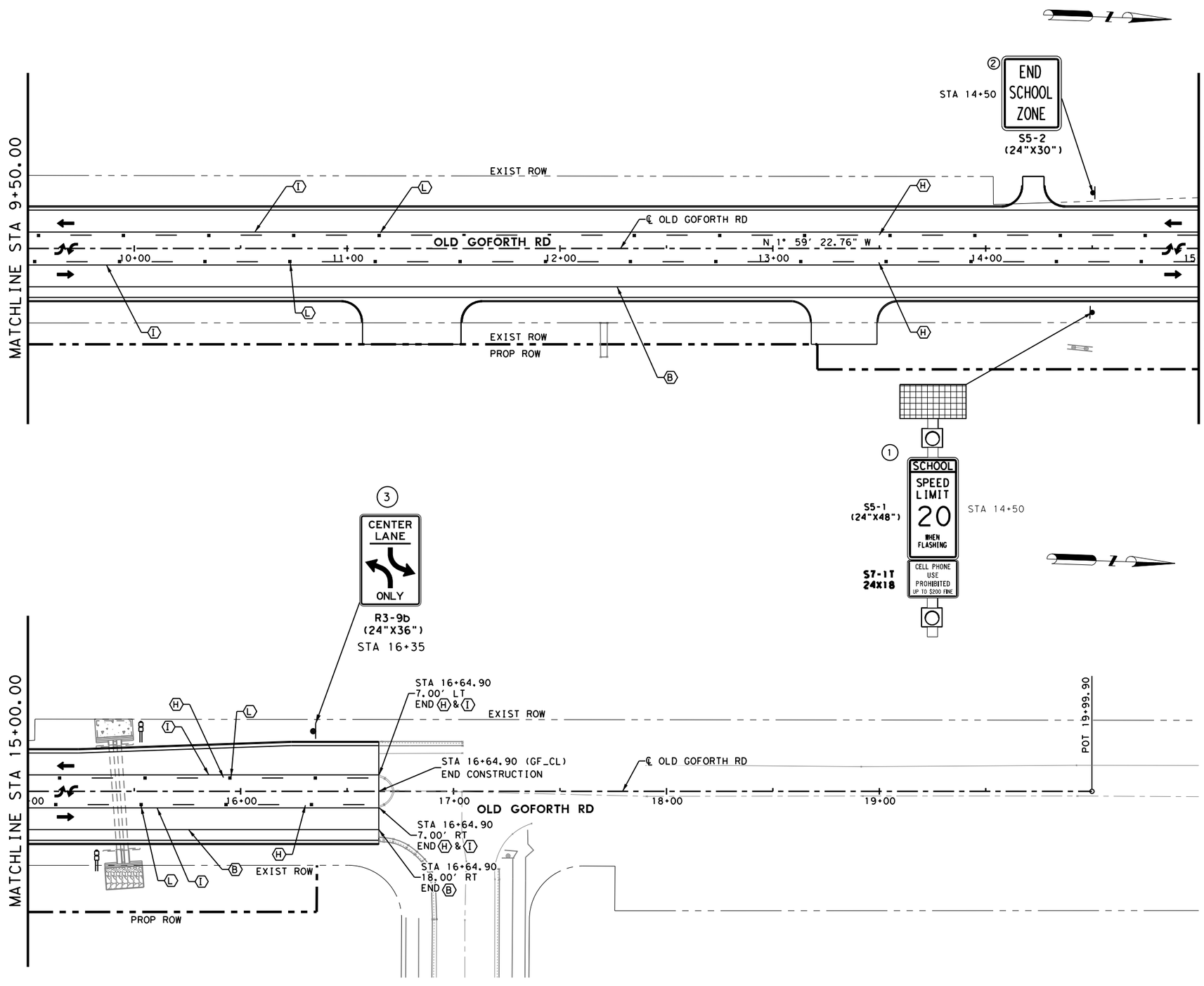
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HILLSIDE TERRACE

SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 10 OF 11
DRAWN BY:		235
CHECKED BY:		
APPROVED BY:		

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LEGEND

A	W 6" BRK
B	W 6" SOLID
C	W 8" SOLID
D	W 12" SOLID
E	W 24" SOLID
F	W ARROW
G	W WORD
H	Y 6" BRK
I	Y 6" SOLID
J	Y 12" SOLID
K	TY I-C
L	TY II-A-A
M	Y 24" SOLID
N	W DBL ARROW
O	W BIKE SYMBOL
P	W BIKE ARROW
Q	W 6" DOT

OBJECT MARKER (OM-2X)(WC)(GND)

PROPOSED SIGN POST

DELINEATOR (D-SW)(SZ1)(BRF)(GF2)(BI)

DELINEATOR (D-SW)(SZ)(BRF)(CTB)(BI)

DIRECTION OF TRAFFIC

0 25 50

SCALE: 1"=50'

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT TO BE USED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES

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HILLSIDE TERRACE

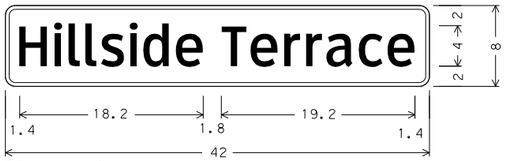
SIGNING & PAVEMENT MARKING LAYOUT

DESIGNED BY:		SHEET 11 OF 11
DRAWN BY:		236
CHECKED BY:		
APPROVED BY:		

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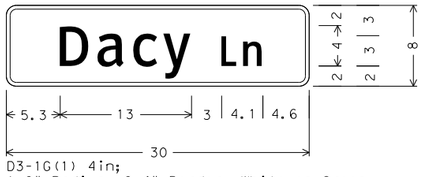
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SHEET 1, SIGN 7
SHEET 2, SIGN 1
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SHEET 3, SIGN 2
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SHEET 4, SIGN 4
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SHEET 9, SIGN 4



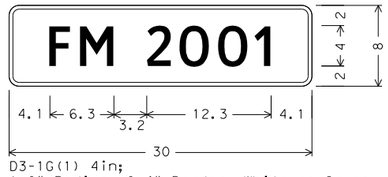
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1.0" Radius, 0.4" Border, White on Green;
"Hillside Terrace", ClearviewHwy-3-W 59% spacing;

SHEET 2, SIGN 4



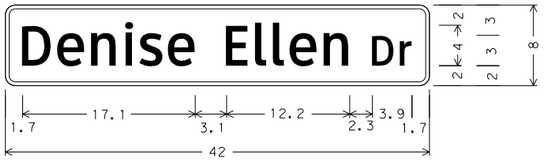
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Dacy", ClearviewHwy-3-W;
"Ln", ClearviewHwy-3-W;

SHEET 9, SIGN 4



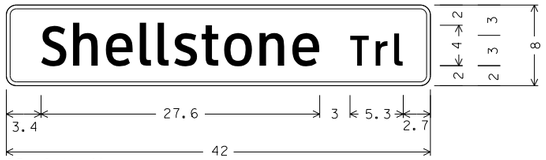
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"FM 2001", ClearviewHwy-3-W;

SHEET 1, SIGN 8



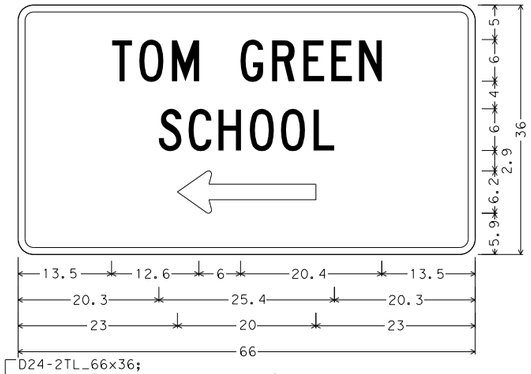
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Denise Ellen", ClearviewHwy-3-W 70% spacing;
"Dr", ClearviewHwy-3-W 70% spacing;

SHEET 3, SIGN 2



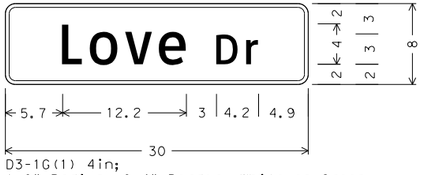
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Shellstone", ClearviewHwy-3-W 70% spacing;
"Trl", ClearviewHwy-3-W;

SHEET 4, SIGN 8



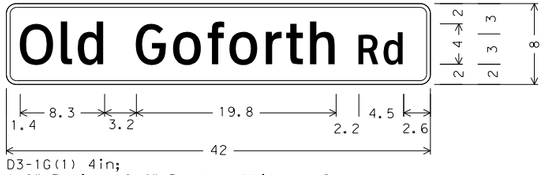
D24-2TL_66x36;
2.3" Radius, 1.0" Border, White on Green;
"TOM GREEN", C; "SCHOOL", C;
Standard Arrow Custom 20.0" X 6.1" 180°;

SHEET 1, SIGN 7



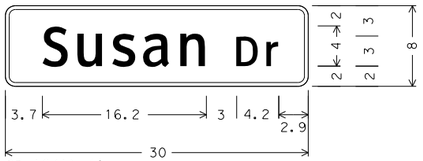
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Love", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;

SHEET 4, SIGN 3
SHEET 4, SIGN 6
SHEET 10, SIGN 1



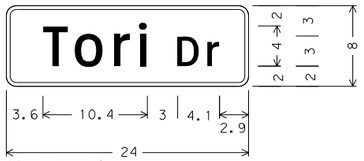
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Old Goforth", ClearviewHwy-3-W 72% spacing;
"Rd", ClearviewHwy-3-W 75% spacing;

SHEET 2, SIGN 1



D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Susan", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;

SHEET 4, SIGN 4
SHEET 4, SIGN 7



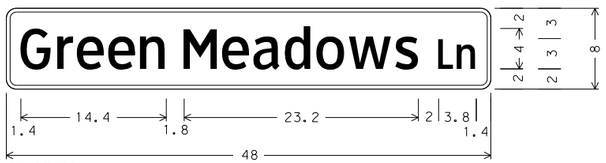
D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Tori", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;

SHEET 2, SIGN 2



D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Regina", ClearviewHwy-3-W;
"Dr", ClearviewHwy-3-W;

SHEET 6, SIGN 1



D3-1G(1) 4in;
1.0" Radius, 0.4" Border, White on Green;
"Green Meadows", ClearviewHwy-3-W 50% spacing;
"Ln", ClearviewHwy-3-W 50% spacing;

PRELIMINARY

SUBMITTED FOR INTERIM REVIEW
Under the authority of:

JOHN W. TULEY, PE No 102441
DATE: 1/27/2023 , IT IS NOT
TO BE USED FOR CONSTRUCTION,
BIDDING OR PERMIT PURPOSES

1/27/2023

NO.	DATE	REVISION	APPROVED

BGE, Inc.
101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
TBPE Registration No. F-1046

HILLSIDE TERRACE

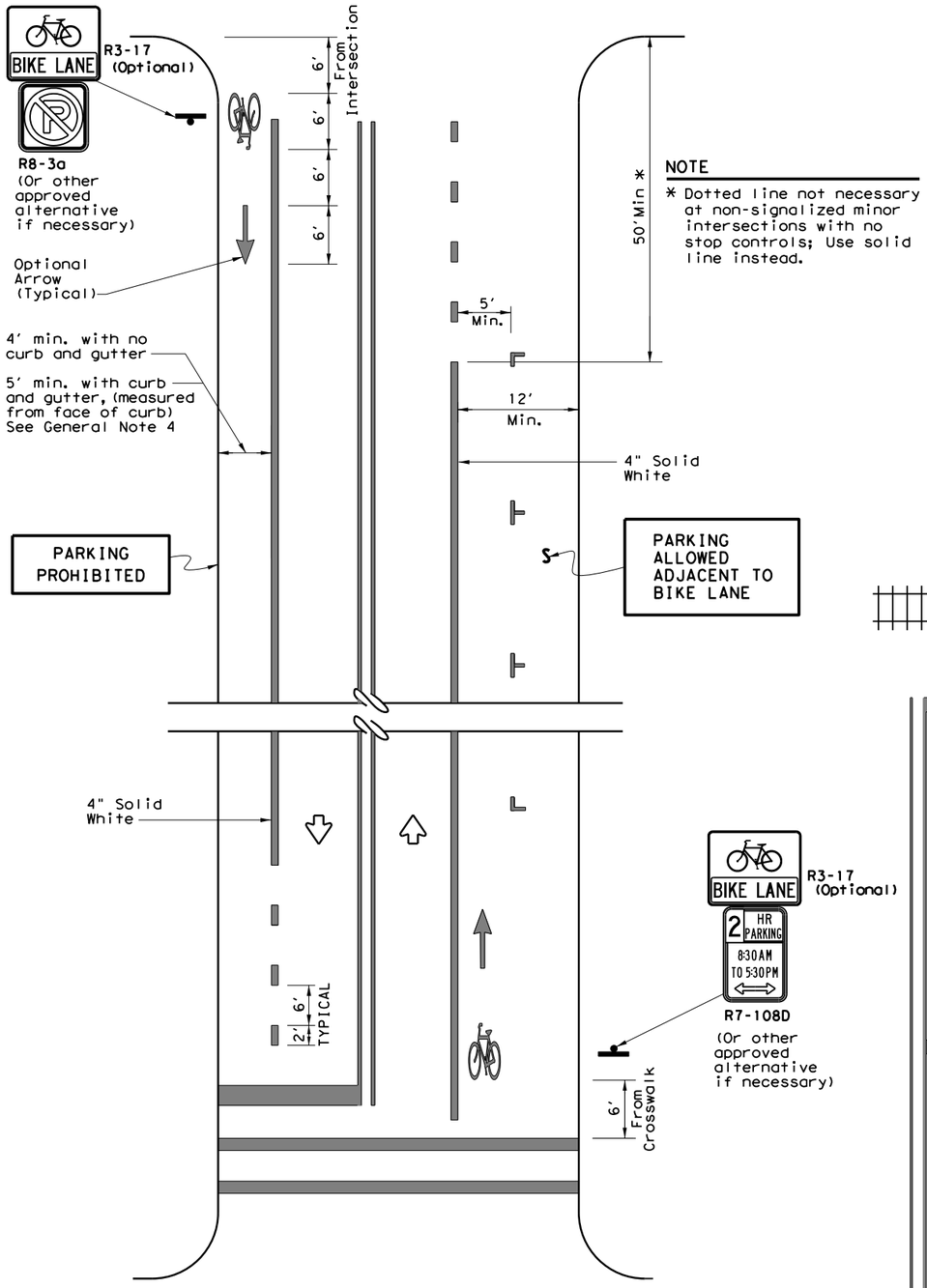
SIGN DETAILS

DESIGNED BY:		SHEET 1 OF 1
DRAWN BY:		237
CHECKED BY:		
APPROVED BY:		

1/27/2023 2:17:02 PM pdf.pltcfg
c:\pwworkdir\bgepw-projects\mhancock\dms05987\HST*SignDetails*01.dgn

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DATE: 1/27/2023 2:17:05 PM
FILE: c:\pwworkdir\bgepw-projects\mhancock\dms05989\blpm-10.dgn



NOTE

* Dotted line not necessary at non-signalized minor intersections with no stop controls; Use solid line instead.

NOTES

1. Bicycle lane pavement markings typically repeated after each intersection or signalized driveway.
2. On uninterrupted sections of roadway, bicycle lane pavement markings typically repeated as follows:

   -1200' for 45 MPH or less roads
   -2500' for 50 MPH and greater roads.

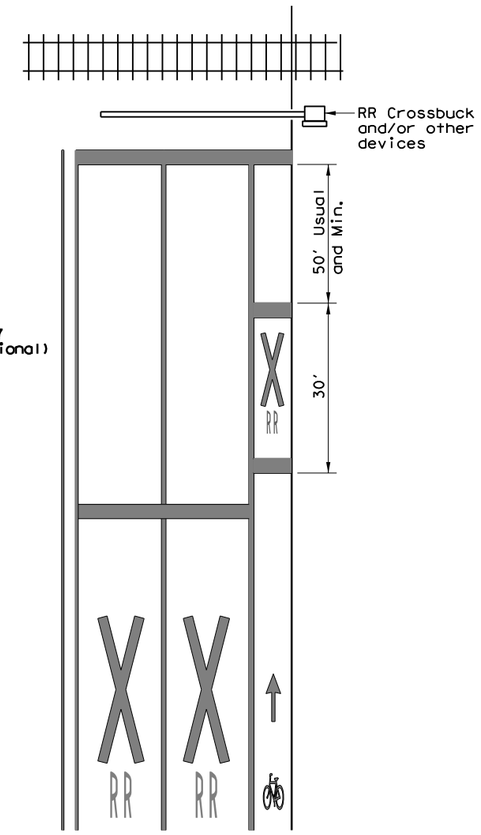
TWO-WAY STREET

GENERAL NOTES

1. All bicycle lane pavement markings shall be white unless otherwise noted.
2. All pavement marking materials shall meet the required Department Material Specifications as specified by the plans.
3. Exact sign placement and details are shown elsewhere in the plans.
4. The current edition of AASHTO'S Guide for the Development of Bicycle Facilities should be referenced for variations in design, other geometric conditions, and lane width options.
5. Other bicycle lane symbol or word markings as shown in the Texas Manual on Uniform Traffic Control Devices may be used. Details for words, arrows and symbols as shown in the Standard Highway Sign Designs for Texas.
6. The "BIKE LANE" (R3-17) sign with the "AHEAD" (R3-17a) sign mounted directly below should be installed in advance of the beginning of a marked bike lane.
7. The "BIKE LANE" (R3-17) sign with the "END" (R3-17b) sign mounted directly below should be installed at the end of marked bicycle lane.

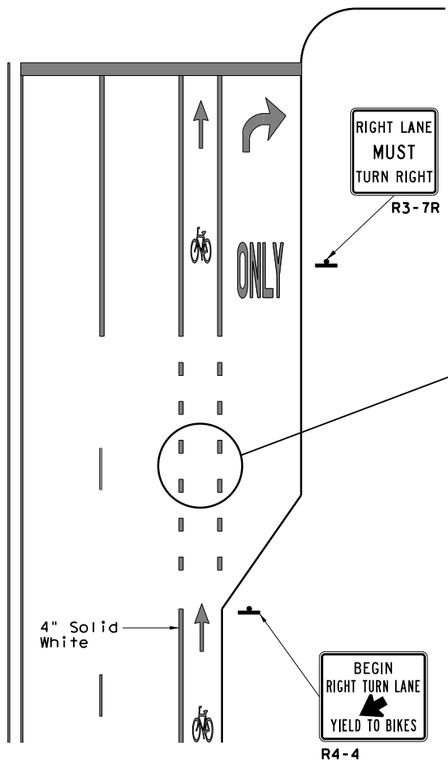
LEGEND	
	Sign
	Traffic Flow

SPECIFICATION REFERENCE TABLE	
Traffic Paint	DMS-8200
Hot Applied Thermoplastic	DMS-8220
Permanent Prefabricated Pavement Markings	DMS-8240
Glass Traffic Beads	DMS-8290

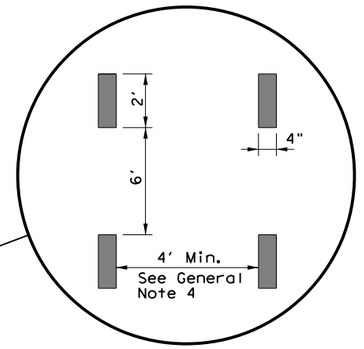


(See RCPM Standard for travel lane details)

RAILROAD CROSSING APPROACH



RIGHT TURN ONLY LANE



DETAIL "A"

Texas Department of Transportation
Traffic Operations Division

BICYCLE LANE PAVEMENT MARKINGS

BLPM-10

© TxDOT May 2010

REVISIONS

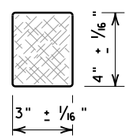
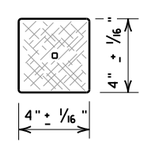
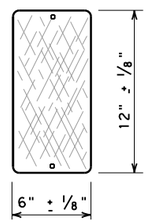
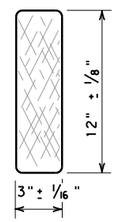
DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT

CONT	SECT	JOB	HIGHWAY
			HILLSIDE TER

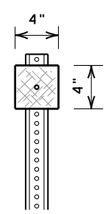
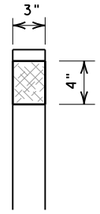
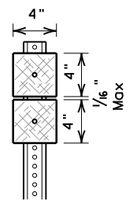
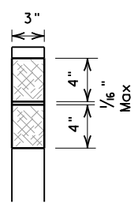
DIST	COUNTY	SHEET NO.
AUS	HAYS	238

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REFLECTOR UNIT SIZES FOR DELINEATORS AND OBJECT MARKERS

	SIZE 1	SIZE 2	SIZE 3	SIZE 4
DEVICE				
SHEETING	Yellow, White or Red Type B or C reflective sheeting			
NOTE	1. Size 1 and 4 - Direct applied reflective sheeting for use on flexible post (flx). 2. Size 2 and 3 - For use on wing channel (wc) post only. Use approved metal, plastic or fiberglass backplate with 17/64" mounting holes.			

DELINEATORS

DEVICE	SINGLE		DOUBLE	
				
	1-Size 2 reflector unit	1-Size 1 reflector unit	2-Size 2 reflector units	2-Size 1 reflector units
SHEETING	Yellow, White or Red Type B or C Reflective Sheeting			
POST TYPE	WC	YFLX, WFLX	WC	YFLX, WFLX
MOUNT TYPE	GND	GND, SRF	GND	GND, SRF

D & OM DESCRIPTIVE CODES

INSTL DEL ASSM (D-XX)SZ X (XXXX)XXX(XX)

NUMBER OF REFLECTORS
S = Single
D = Double

COLOR OF REFLECTORS
W = White
Y = Yellow
R = Red

REFLECTOR UNIT SIZE
1 or 2

TYPE OF POST OR DELINEATOR
WC = Wing Channel Post
YFLX = Yellow Flexible Post
WFLX = White Flexible Post
BRF = Barrier Reflector

TYPE OF MOUNT
GND = Embedded (drivable or set in concrete)
CTB = Concrete Barrier Mount
GF1 or GF2 = Guard Fence Attachment
SRF = Surface Mount

DIRECTION
If Required
BI = Bi-Directional
BR = Bi-Directional with red on back

INSTL OM ASSM (OM-XX) (XXXX)XXX(XX)

TYPE OF OBJECT MARKER
1, 2, 3, or 4

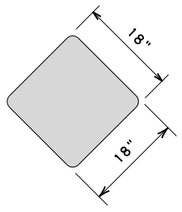
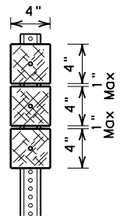
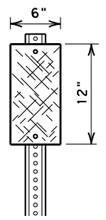
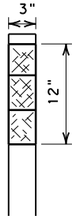
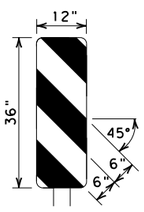
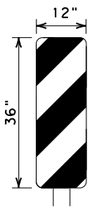
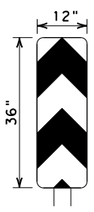
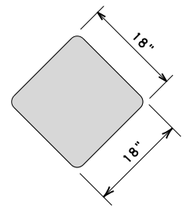
NUMBER OF REFLECTORS OR DIRECTION
X = 3-Size 2 reflector units (Type 2 only)
Y = 1-Size 3 reflector unit (Type 2 only)
Z = 3-Size 1 or 1-Size 4 reflector unit(s) (Type 2 only)
L = Left Side (Type 3 Object Marker only)
R = Right Side (Type 3 Object Marker only)
C = Center (Type 3 Object Marker only)

TYPE OF POST
WC = Wing Channel Post
WFLX = White Flexible Post
TWT = Thin Walled Tubing

TYPE OF MOUNT
GND = Embedded (drivable)
SRF = Surface Mount
WAS = Wedge Anchor Steel
WAP = Wedge Anchor Plastic

DIRECTION
If Required
BI = Bi-Directional

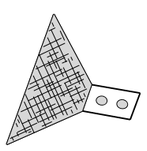
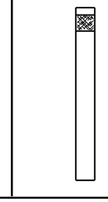
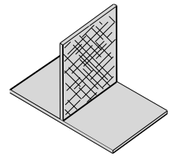
OBJECT MARKERS

	Type 1 (OM-1)	Type 2 (OM-2)			Type 3 (OM-3)			Type 4 (OM-4)
	OM-1	OM-2X	OM-2Y	OM-2Z	OM-3L	OM-3R	OM-3C	OM-4
DEVICE								
		3-Size 2 reflector units	1-Size 3 reflector unit	3-Size 1 reflector units or 1-Size 4 reflector unit				
SHEETING	Yellow-Type B_{FL} or C_{FL} Sheeting	Yellow - Type B or C Sheeting			Alternating acrylic black and retroflective yellow - Type B_{FL} or C_{FL} Sheeting			Red -Type B_{FL} or C_{FL} Sheeting
POST TYPE	TWT	WC	WC	WFLX	TWT			TWT
MOUNT TYPE	WAS, WAP	GND	GND	GND, SRF	WAS, WAP			WAS, WAP

DEPARTMENTAL MATERIAL SPECIFICATIONS

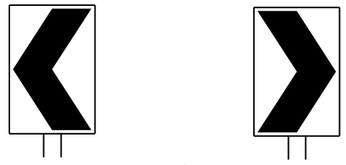
FLEXIBLE DELINEATOR & OBJECT MARKER POSTS (EMBEDDED & SURFACE MOUNT TYPES)	DMS-4400
SIGN FACE MATERIALS	DMS-8300
DELINEATORS, OBJECT MARKERS AND BARRIER REFLECTORS	DMS-8600

BARRIER REFLECTORS (BRF)

	GF1	GF2	CTB
DEVICE			
	1. Barrier reflectors shall meet the requirements of DMS 8600. 2. Approved Barrier Reflectors are listed on the "Barrier Reflectors" Material Producer List at: www.txdot.gov.		
SHEETING	Yellow, White, Red		
NOTE	1. Reflective sheeting shall have a minimum dimension of 3 inches and minimum surface area of 9 square inches.		

CHEVRONS

DEVICE

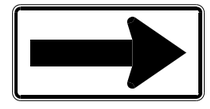


SIZE (W x L)	18"x 24" (Conventional)	24"x 30" (Conventional Oversize)	30"x 36" (Expressway)	36" x 48" (Freeway)
MOUNTING HEIGHT	4'-0" or 7'-0"		7'-0" Only	

NOTE
1. CHEVRON (W1-8) signs and ONE DIRECTION LARGE ARROW (W1-6) Signs shall be installed per Sign Mounting Details (SMD) Standard Sheets and paid under Item 644 (Small Roadside Sign Assemblies).
2. When there is a need to increase conspicuity, the Texas version of the ONE DIRECTION LARGE ARROW sign (W1-9T) may be used instead of the ONE DIRECTION LARGE ARROW (W1-6).

ONE DIRECTION LARGE ARROW

DEVICE



SIZE (W x L)	48" x 24" (Conventional)	60" x 30" (Expressway & Freeway)
MOUNTING HEIGHT	7'-0"	

NOTE:
Delineator and object marker substrates and sign substrates shall be 0.080" Aluminum sign blank to conform to ASTM B-209 Alloy 6061-T6 or approved alternative.

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER MATERIAL DESCRIPTION

D & OM(1)-20

FILE: dom1-20.dgn	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
©TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
10-09 3-15	DIST	COUNTY		SHEET NO.
4-10 7-20	AUS	HAYS		239

20A

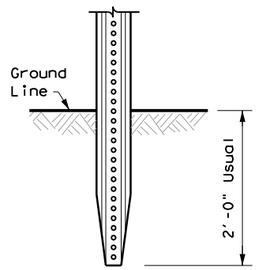
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POST TYPE AND SUPPORT FOUNDATION DETAILS

WING CHANNEL (WC)

GND

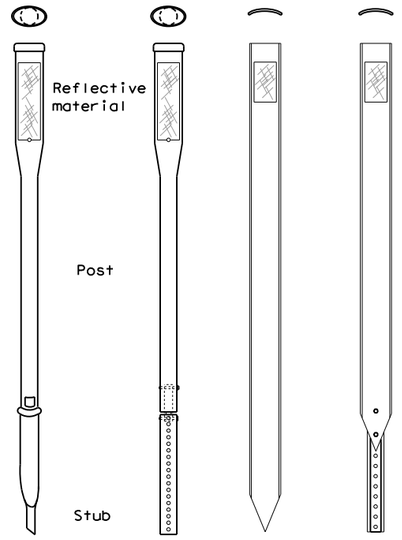


NOTES

1. Embedded Wing Channel (WC) post option may be used for Type 2 Object Markers and Delineators only.
2. 1.12 lbs/ft steel per ASTM A 1011 SS Gr. 50, or ASTM A499.

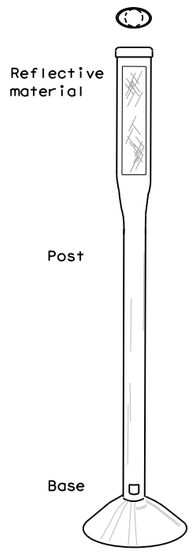
FLEXIBLE POSTS (YFLX, WFLX)

GND



EMBEDDED

SRF



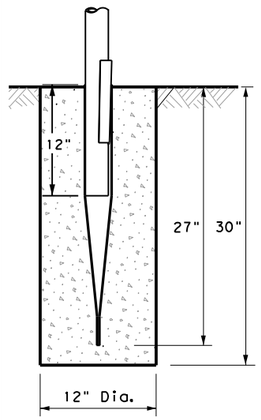
SURFACE MOUNT

NOTES

1. See "Flexible Delineator and Object Marker Posts" Material Producer List for approved devices.
2. Install per manufacturer's recommendations.
3. Post length may vary to meet field conditions.
4. When using yellow delineators with flexible posts to separate opposing direction of travel, such as centerline or median use, the flexible posts shall be yellow.

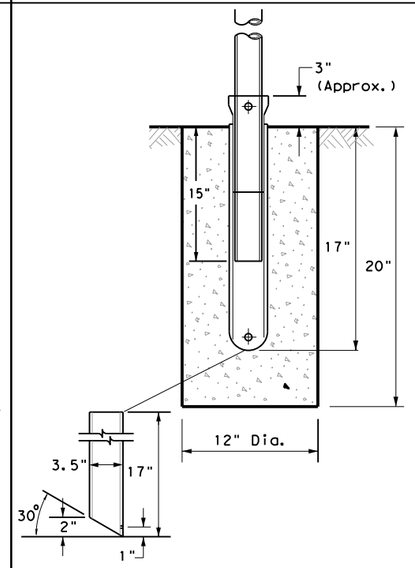
WEDGE ANCHOR SYSTEMS

WAS



STEEL

WAP



PLASTIC

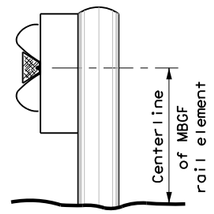
NOTE

1. Install per manufacturer's recommendations.

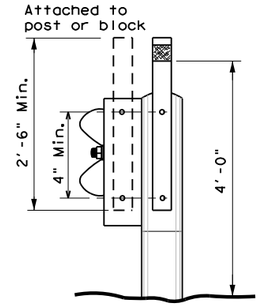
TYPE OF BARRIER MOUNTS

GUARD FENCE ATTACHMENT

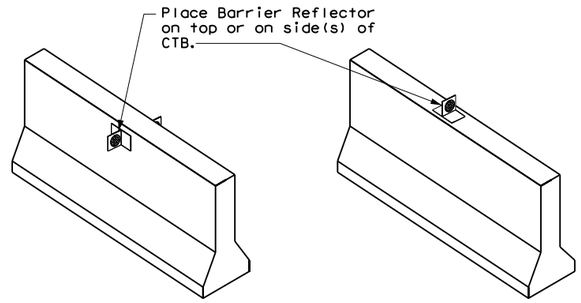
GF1



GF2



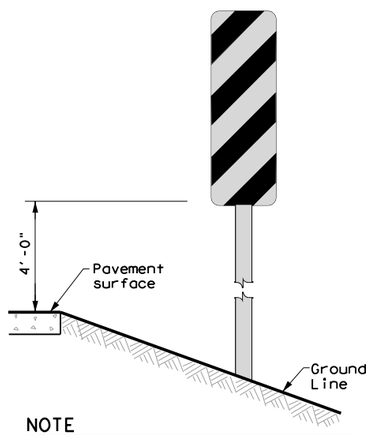
CONCRETE TRAFFIC BARRIER (CTB)



GENERAL NOTES

1. Place delineators on a section of roadway at a consistent distance from the edge of pavement.
2. Where a restriction prevents consistent placement from the pavement edge, place the affected object markers in line with the innermost edge of the obstruction.
3. When Type 2 object markers and delineators are more than 8'-0" from the edge of the pavement, it may not be possible to maintain a height of approximately 4'-0". If this is the case, place the object marker or delineator as close to the desired height as possible.
4. Install all delineators, object markers and barrier reflectors in accordance with the manufacturer's recommendation.
5. Barrier reflectors should be installed a minimum of 18 inches above the edge of the pavement surface.
6. Diagonal stripes on Type 3 object markers shall slope down toward the intended travel lane.

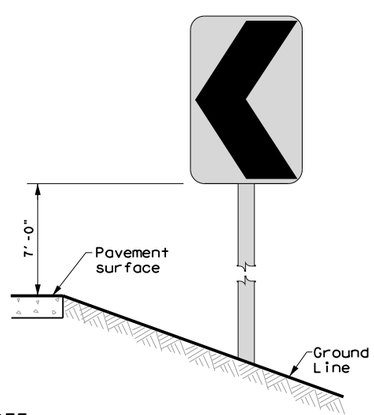
TYPES 1, 3, AND 4 OBJECT MARKERS AND CHEVRONS



NOTE

Mounting at 4 feet to the bottom of the chevron is permitted for chevrons that will not exceed a height of 6'-6" to the top of the chevron (sizes 24" x 30" and smaller)

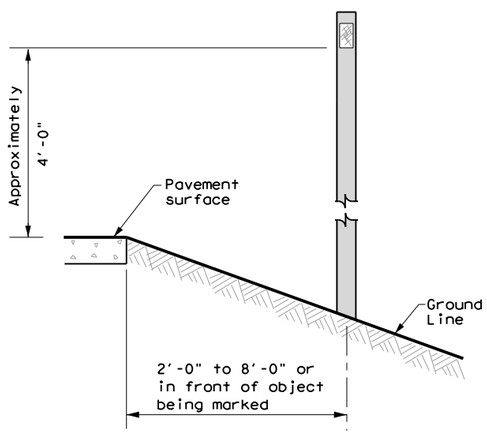
CHEVRONS AND ONE DIRECTION LARGE ARROW SIGN



NOTE

Chevrons 30" x 36" and larger shall be mounted at a height of 7' to the bottom of the chevron. Chevron sign and ONE DIRECTION LARGE ARROW sign (W1-9T) shall be installed per SMD standard sheets and paid under item 644.

DELINEATORS AND TYPE 2 OBJECT MARKERS



See general notes 1, 2 and 3.

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER INSTALLATION

D & OM(2)-20

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© TxDOT August 2004	CONT	SECT	JOB	HIGHWAY
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4-10 7-20	AUS	HAYS		240

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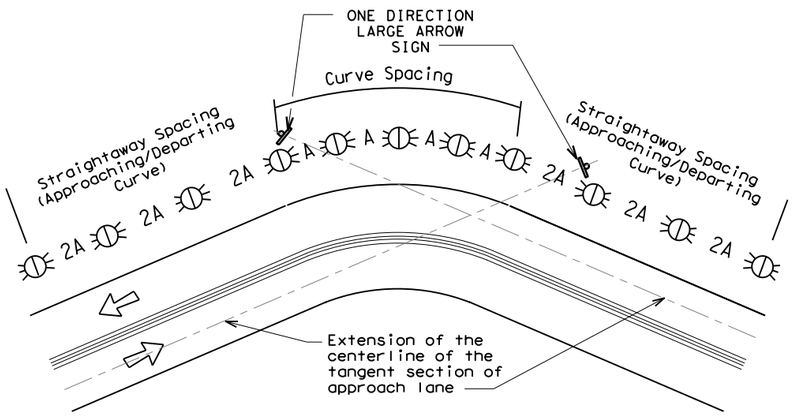
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MINIMUM WARNING DEVICES AT CURVES WITH ADVISORY SPEEDS

Amount by which Advisory Speed is less than Posted Speed	Curve Advisory Speed	
	Turn (30 MPH or less)	Curve (35 MPH or more)
5 MPH & 10 MPH	• RPMs	• RPMs
15 MPH & 20 MPH	• RPMs and One Direction Large Arrow sign	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons.
25 MPH & more	• RPMs and Chevrons; or • RPMs and One Direction Large Arrow sign where geometric conditions or roadside obstacles prevent the installation of chevrons	• RPMs and Chevrons

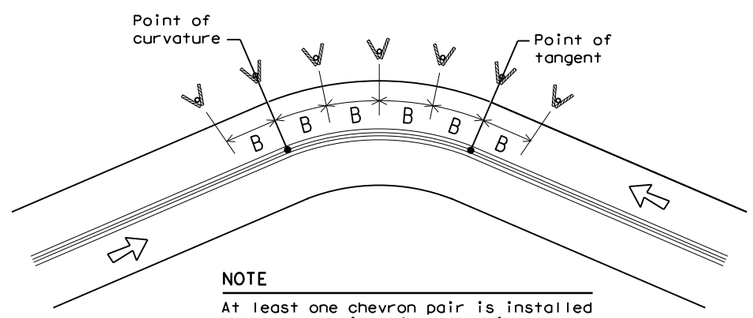
SUGGESTED SPACING FOR DELINEATORS ON HORIZONTAL CURVES



NOTE

ONE DIRECTION LARGE ARROW (W1-6) sign should be located at approximately and perpendicular to the extension of the centerline of the tangent section of approach lane.

SUGGESTED SPACING FOR CHEVRONS ON HORIZONTAL CURVES



NOTE

At least one chevron pair is installed beyond the point of tangent in tangent section.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS KNOWN

Degree of Curve	FEET			
	Radius of Curve	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
		A	2A	B
1	5730	225	450	——
2	2865	160	320	——
3	1910	130	260	200
4	1433	110	220	160
5	1146	100	200	160
6	955	90	180	160
7	819	85	170	160
8	716	75	150	160
9	637	75	150	120
10	573	70	140	120
11	521	65	130	120
12	478	60	120	120
13	441	60	120	120
14	409	55	110	80
15	382	55	110	80
16	358	55	110	80
19	302	50	100	80
23	249	40	80	80
29	198	35	70	40
38	151	30	60	40
57	101	20	40	40

Curve delineator approach and departure spacing should include 3 delineators spaced at 2A. This spacing should be used during design preparation or when the degree of curve is known.

DELINEATOR AND CHEVRON SPACING

WHEN DEGREE OF CURVE OR RADIUS IS NOT KNOWN

Advisory Speed (MPH)	Spacing in Curve	Spacing in Straightaway	Chevron Spacing in Curve
	A	2xA	B
65	130	260	200
60	110	220	160
55	100	200	160
50	85	170	160
45	75	150	120
40	70	140	120
35	60	120	120
30	55	110	80
25	50	100	80
20	40	80	80
15	35	70	40

If the degree of curve is not known, delineator spacing may be determined based on the Advisory Speed of the curve. Use the delineator curve spacing for each Advisory Speed (MPH).

DELINEATOR AND OBJECT MARKER APPLICATION AND SPACING

CONDITION	REQUIRED TREATMENT	MINIMUM SPACING
Frwy./Exp. Tangent	RPMs	See PM-series and FPM-series standard sheets
Frwy./Exp. Curve	Single delineators on right side	See delineator spacing table
Frwy/Exp.Ramp	Single delineators on at least one side of ramp (should be on outside of curves) (see Detail 3 on D&OM(4))	100 feet on ramp tangents Use delineator spacing table for ramp curves ("straightway spacing" does not apply to ramp curves)
Acceleration/Deceleration Lane	Double delineators (see Detail 3 on D&OM(4))	100 feet (See Detail 3 on D & OM (4))
Truck Escape Ramp	Single red delineators on both sides	50 feet
Bridge Rail (steel or concrete)and Metal Beam Guard Fence	Bi-Directional Delineators when undivided with one lane each direction Single Delineators when multiple lanes each direction	Equal spacing (100'max) but not less than 3 delineators
Concrete Traffic Barrier (CTB) or Steel Traffic Barrier	Barrier reflectors matching the color of the edge line	Equal spacing 100' max
Cable Barrier	Reflectors matching the color of the edge line	Every 5th cable barrier post (up to 100'max)
Guard Rail Terminus/Impact Head	Divided highway - Object marker on approach end Undivided 2-lane highways - Object marker on approach and departure end	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5) and D & OM (6)
Bridges with no Approach Rail	Type 3 Object Marker (OM-3) at end of rail and 3 single delineators approaching rail	See D & OM(5)
Reduced Width Approaches to Bridge Rail	Type 2 and Type 3 Object Markers (OM-3) and 3 single delineators approaching bridge	Requires reflective sheeting provided by manufacturer per D & OM (VIA) or a Type 3 Object Marker (OM-3) in front of the terminal end See D & OM (5)
Culverts without MBGF	Type 2 Object Markers	See Detail 2 on D & OM(4)
Crossovers	Double yellow delineators and RPMs	See Detail 1 on D & OM (4)
Pavement Narrowing (lane merge) on Freeways/Expressway	Single delineators adjacent to affected lane for full length of transition	100 feet

NOTES

1. Unless indicated otherwise, the delineator or barrier reflector color shall conform to the color of the pavement edge line on the side of the road where the delineators or barrier reflectors are placed.
2. Barrier reflectors may be used to replace required delineators.
3. Single red delineators may be mounted on the back side of delineator posts for wrong way driver applications

LEGEND

	Bi-directional Delineator
	Delineator
	Sign

Texas Department of Transportation — Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

D & OM(3)-20

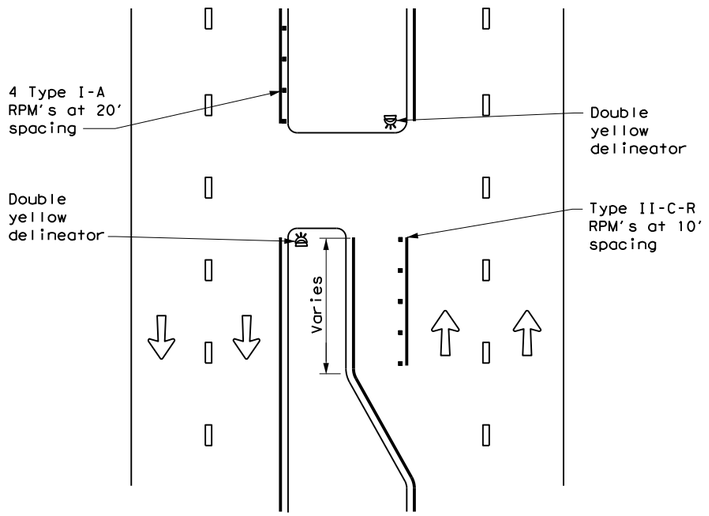
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REVISIONS				HILLSIDE TER
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8-15 7-20	AUS	HAYS		241

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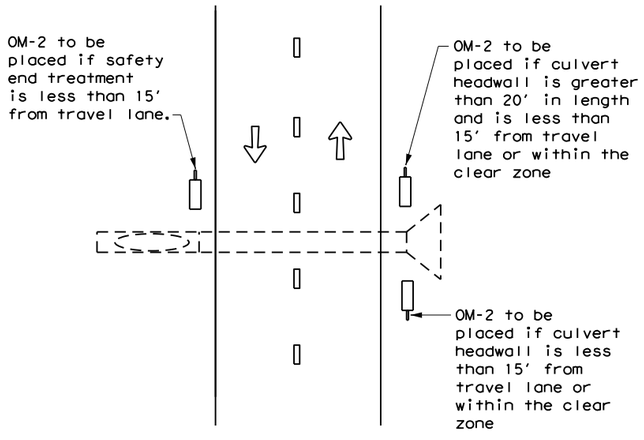
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CROSSOVERS



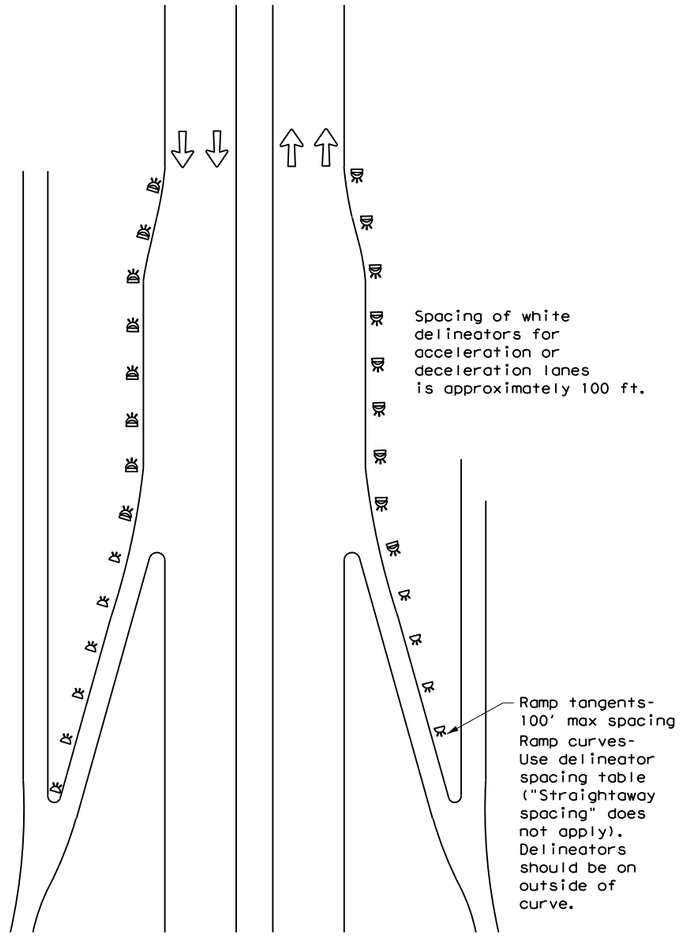
DETAIL 1

FOR CULVERTS WITHOUT MBGF



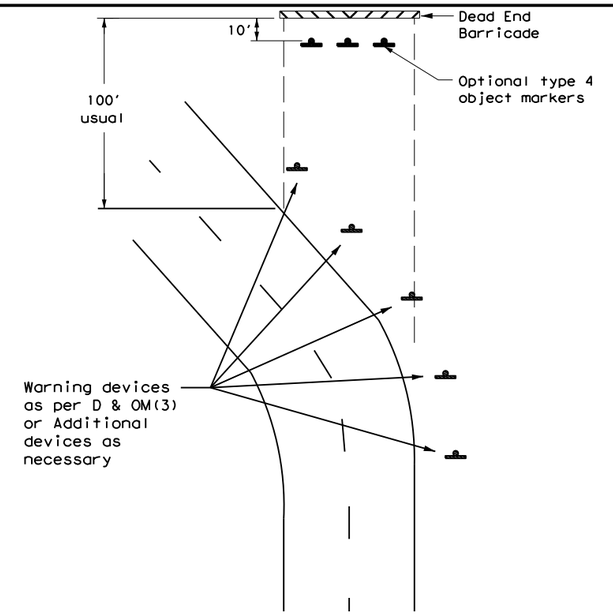
DETAIL 2

FREEWAY DELINEATION FOR RAMPS AND ACCELERATION/DECELERATION LANES



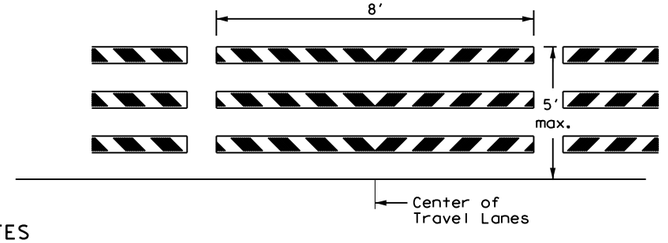
DETAIL 3

TYPICAL APPLICATION OF DEAD END BARRICADE



DETAIL 4

TYPICAL DEAD END BARRICADE INSTALLATION



NOTES

1. Barricade striping shall be red and white reflective sheeting for all permanent road closures.
2. Barricade striping is red and white sloping toward the center of the roadway.
3. Type 3 Barricade Supports should be anchored to soil or pavement as described in compliant Work Zone Traffic Control Devices List, section D.2.f and D.2.g.

DETAIL 5

LEGEND	
	Bidirectional Delineator
	Delineator
	OM-3
	Barricade
	Sign
	OM-2
	Double Delineator

Texas Department of Transportation

Traffic Safety Division Standard

DELINEATOR & OBJECT MARKER PLACEMENT DETAILS

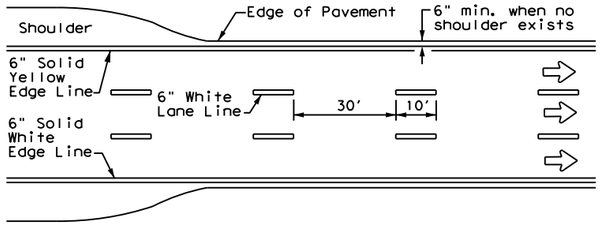
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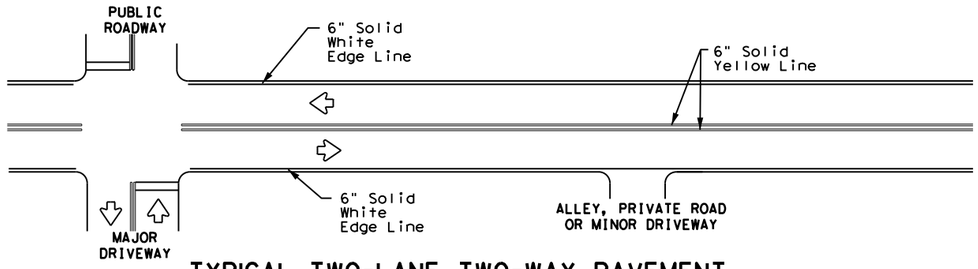
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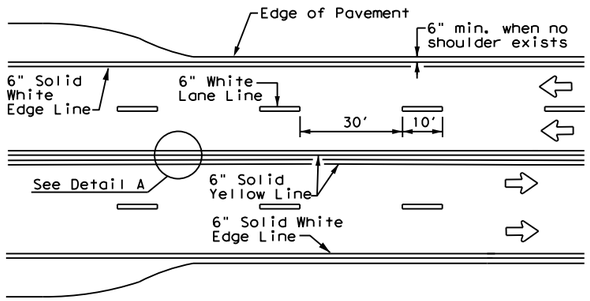
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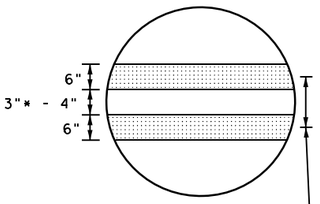


EDGE LINE AND LANE LINES ONE-WAY ROADWAY WITH OR WITHOUT SHOULDERS



TYPICAL TWO-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

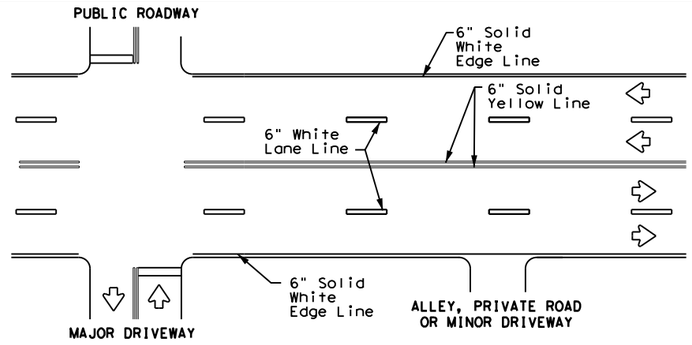




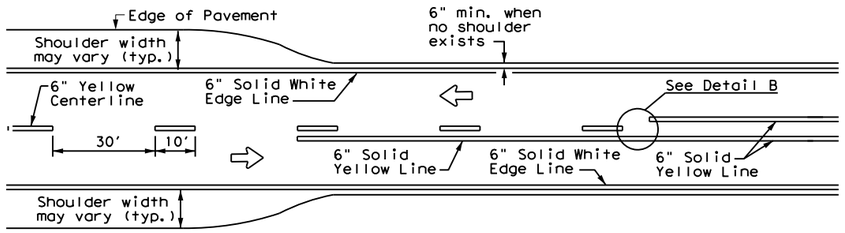
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS

* 2" minimum for restripe projects when approved by the Engineer.

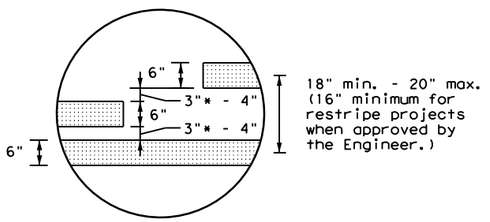
** 8" minimum for restripe projects when approved by the Engineer.



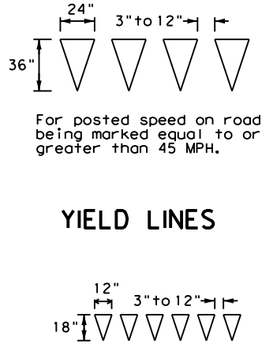
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT MARKINGS THROUGH INTERSECTIONS

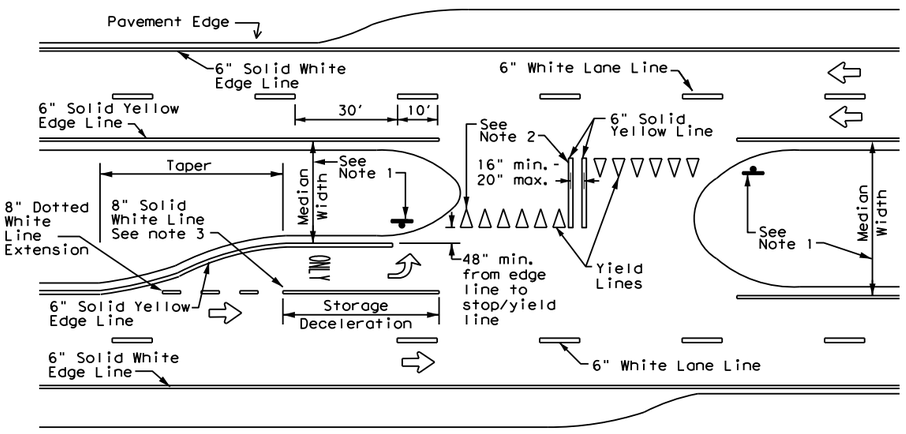


TWO LANE TWO-WAY ROADWAY WITH OR WITHOUT SHOULDERS



* 2" minimum for restripe projects when approved by the Engineer.





FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

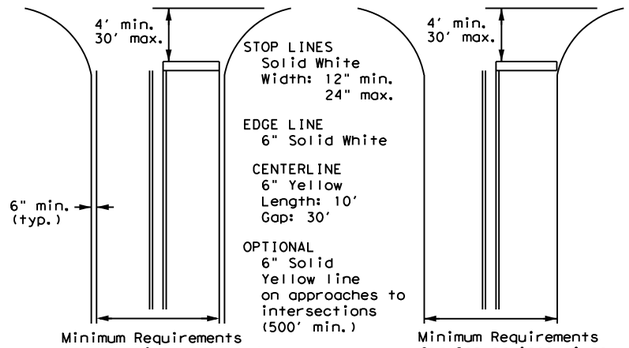
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs and stop bars are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop lines/yield lines) when a 50' or greater median centerline can be placed. Stop lines shall only be used with stop signs. Yield lines shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edge line striping shall be as shown in the plans or as directed by the Engineer. The edge line should not be placed less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edge lines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the center of edge line to the center of edge line of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



NOTE: Traveled way is exclusive of shoulder widths. Refer to General Note 2 for additional details.

GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE

Based on Traveled Way and Pavement Widths for Undivided Roadways

Texas Department of Transportation

Traffic Safety Division Standard

TYPICAL STANDARD PAVEMENT MARKINGS

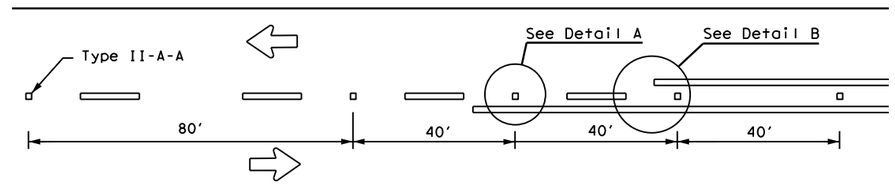
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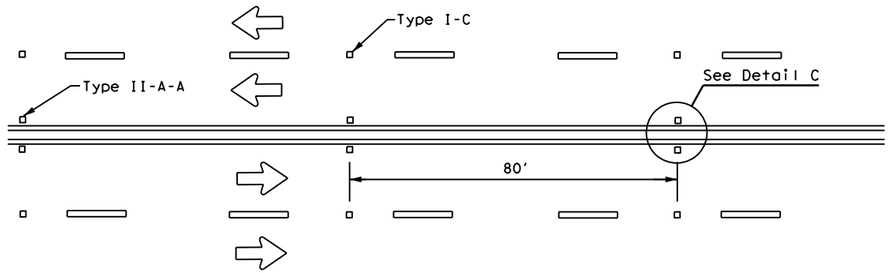
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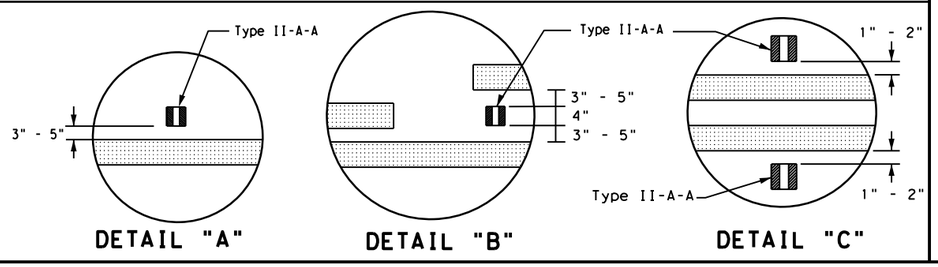
REFLECTIVE RAISED PAVEMENT MARKERS FOR VEHICLE POSITIONING GUIDANCE



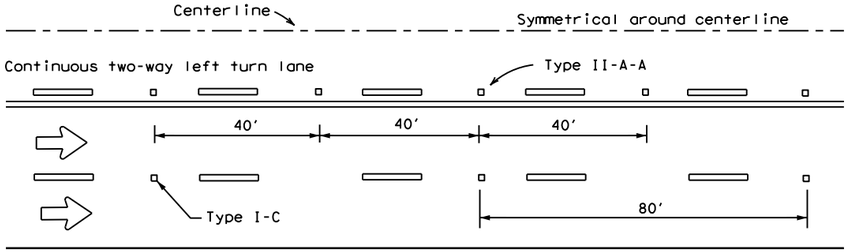
CENTERLINE FOR ALL TWO LANE TWO-WAY ROADWAYS



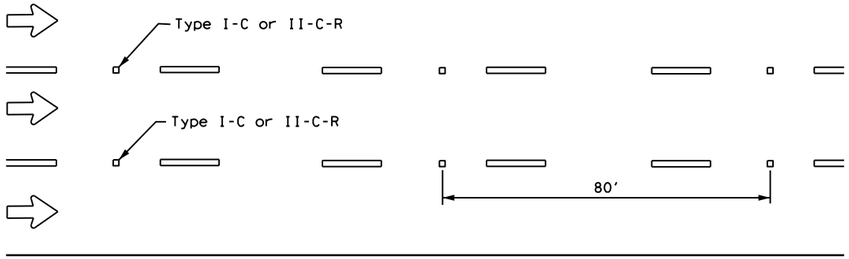
CENTERLINE & LANE LINES FOR FOUR LANE TWO-WAY ROADWAYS



DETAIL "A" **DETAIL "B"** **DETAIL "C"**



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



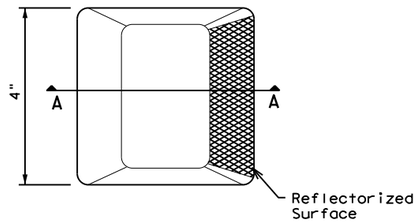
LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

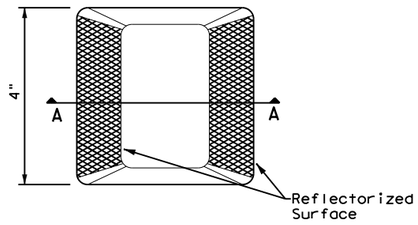
See Note 3.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

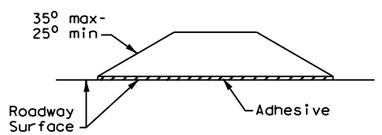
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)

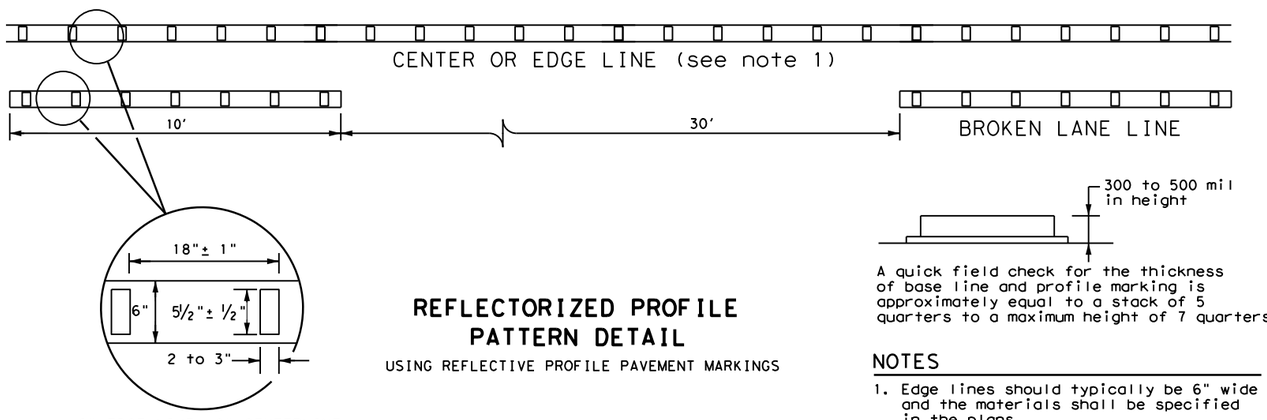


Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS



6" EDGE LINE, 6" CENTERLINE OR 6" LANE LINE

REFLECTORIZED PROFILE PATTERN DETAIL

USING REFLECTIVE PROFILE PAVEMENT MARKINGS

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTES

1. Edge lines should typically be 6" wide and the materials shall be specified in the plans.
2. Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.

GENERAL NOTES

1. All raised pavement markers placed along broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.
3. Use raised pavement marker Type I-C with undivided roadways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.

Texas Department of Transportation

Traffic Safety Division Standard

POSITION GUIDANCE USING RAISED MARKERS RELECTORIZED PROFILE MARKINGS PM(2)-22

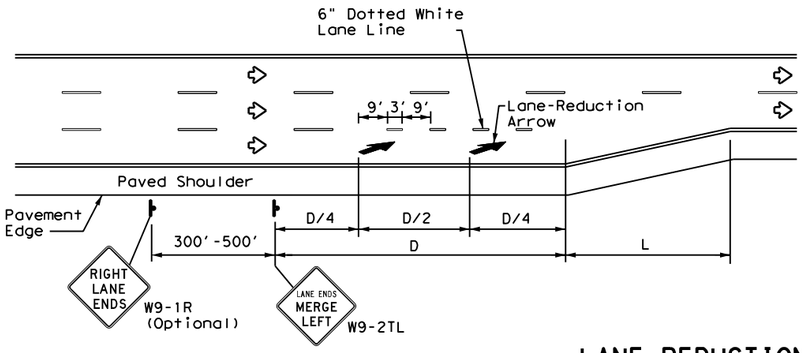
FILE: pm2-22.dgn	DN:	CK:	DW:	CK:
©TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-77 8-00 6-20 4-92 2-10 12-22 5-00 2-12				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		244

22B

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DATE: 1/27/2023 2:17:29 PM
FILE: c:\pwworkdir\bgepw-projects\mhancock\dms05989\pm2-22.dgn

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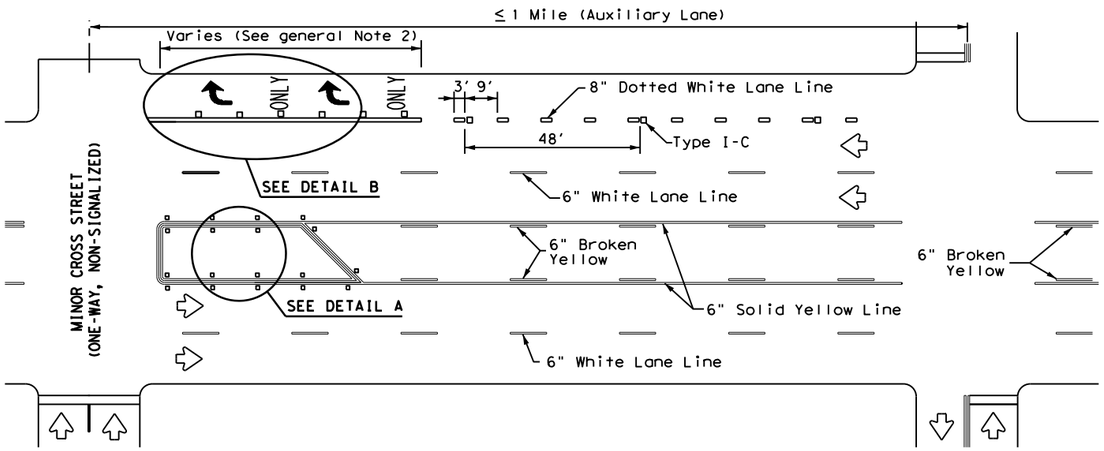


LANE REDUCTION

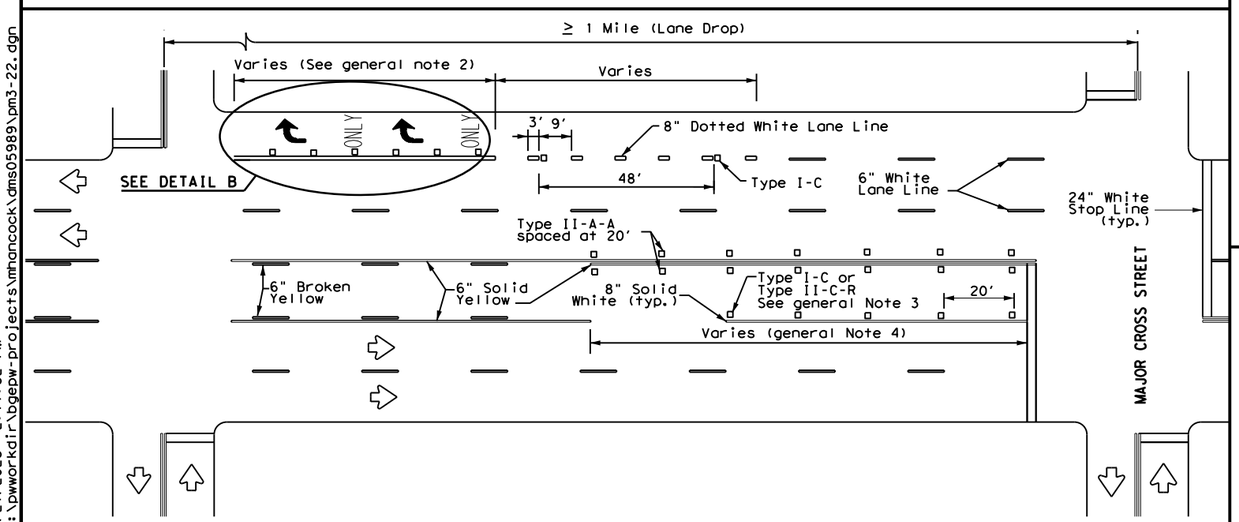
NOTES

1. Lane reduction pavement markings are used where the number of through lanes is reduced because of narrowing of the roadway or because of a section of on-street parking in what would otherwise be a through lane. For Texas Super 2 Passing Lanes, see TS2(PL) standard sheets.
2. On divided highways, an additional RIGHT LANE ENDS (W9-1R) sign may be installed in the median aligned with the W9-1R sign on the right side of the highway.
3. Lane reduction arrows are required for speeds of 45 mph or greater. An optional third lane reduction arrow may be added based on engineering judgement. If used, the optional third lane reduction arrow should be centered between the first and last lane reduction arrows.
4. For lane reductions on Freeways and Expressways, signing shall conform to the TxDOT Freeway Signing Handbook.

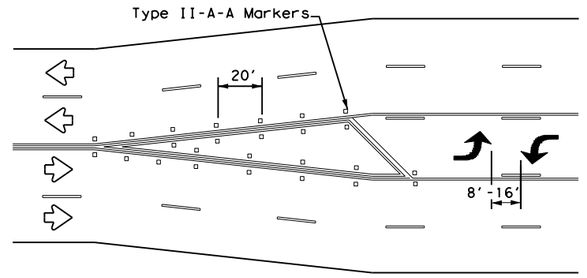
ADVANCED WARNING SIGN DISTANCE (D)		
Posted Speed	D (ft)	L (ft)
30 MPH	460	$L=\frac{WS^2}{60}$
35 MPH	565	
40 MPH	670	
45 MPH	775	L=WS
50 MPH	885	
55 MPH	990	
60 MPH	1,100	
65 MPH	1,200	
70 MPH	1,250	
75 MPH	1,350	



TYPICAL TWLTL AT ONE-WAY STREET AND RIGHT TURN AUXILIARY LANE



TYPICAL TWLTL AT TWO-WAY CROSS STREET AND RIGHT TURN LANE DROP



A two-way left-turn (TWLT) lane-use arrow pavement marking should be used at or just downstream from the beginning of a two-way left-turn lane within a corridor. Repeating the marking after each intersection or dedicated turn bay is not required unless stated elsewhere in the plans.

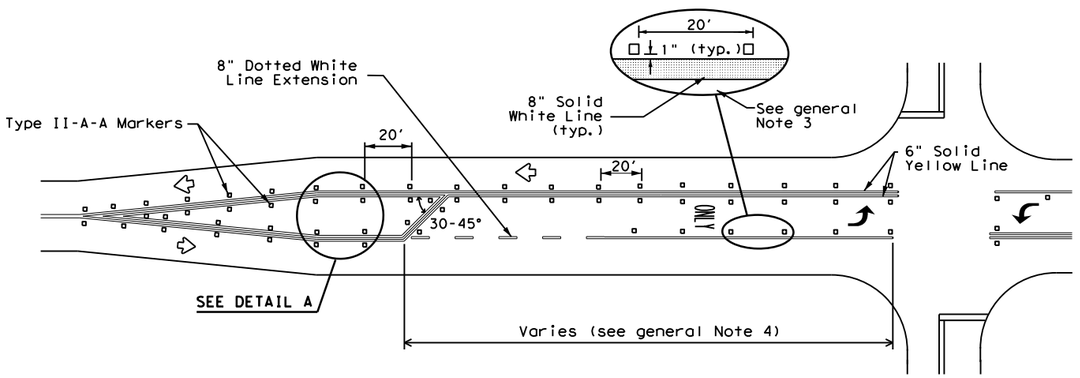
TYPICAL TRANSITION FOR TWLTL AND DIVIDED HIGHWAY

GENERAL NOTES

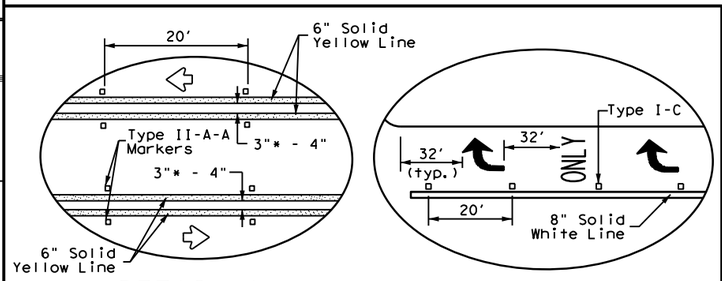
1. Lane use word and arrow markings shall be used where through lanes approaching an intersection become mandatory turn lanes. Lane use word and arrow markings should be used in auxiliary lanes of substantial length. Lane use arrow markings or word and arrow markings may be used in other lanes and turn bays for emphasis. Details for words and arrows are as shown in the Standard Highway Sign Designs for Texas.
2. When lane-use words and arrow markings are used, two sets of arrows should be used if the length of the bay is greater than 180 feet. When a single lane use arrow or word and arrow marking is used for a short turn lane, it should be located at or near the upstream end of the full-width turn lane.
3. Use raised pavement marker Type I-C with undivided highways, flush medians and two way left turn lanes. Use raised pavement marker Type II-C-R with divided highways and raised medians.
4. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer. See Chapter 3 of the Roadway Design Manual for additional information on turning lanes or storage lengths.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



TYPICAL TWO-LANE ROADWAY INTERSECTION WITH LEFT TURN BAYS



* 2" minimum allowed for restripe projects when approved by the Engineer.

Texas Department of Transportation

Traffic Safety Division Standard

TWO-WAY LEFT TURN LANES, RURAL LEFT TURN BAYS, AND LANE REDUCTION PAVEMENT MARKINGS

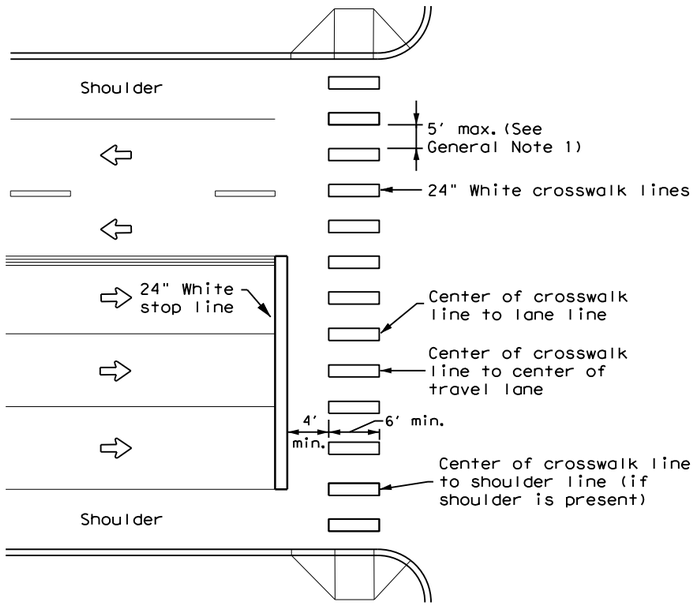
PM(3)-22

FILE: pm3-22.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS 4-98 3-03 6-20 5-00 2-10 12-22 8-00 2-12				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		245

22C

DATE: 1/27/2023 2:17:32 PM
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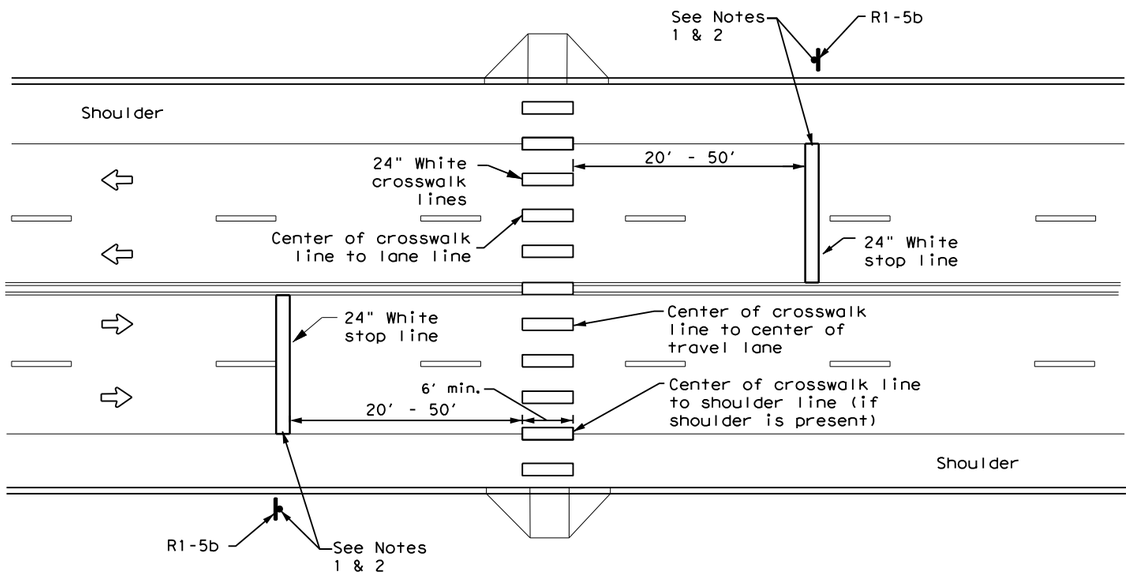
HIGH-VISIBILITY LONGITUDINAL CROSSWALK AT CONTROLLED APPROACH

GENERAL NOTES

1. Longitudinal crosswalk lines should not be placed in the wheel path of vehicles. Center the crosswalk lines on travel lanes, lane lines, and shoulder lines (if present).
2. A minimum 6" clear distance shall be provided to the curb face. If the last crosswalk line falls into this distance it must be omitted.
3. For divided roadways, adjustments in spacing of the crosswalk lines should be made in the median so that the crosswalk lines are maintained in their proper location across the travel portion of the roadway.
4. At skewed crosswalks, the crosswalk lines are to remain parallel to the lane lines.
5. Each crosswalk shall be a minimum of 6' wide.
6. The High-Visibility Longitudinal Crosswalk is the preferred crosswalk pattern on State Highways. Other crosswalk patterns as shown in the "Texas Manual on Uniform Traffic Control Devices" may be used. All crosswalk designs and dimension shall comply with the "Texas Manual on Uniform Traffic Control Devices."
7. Final placement of Stop Bar and Crosswalk shall be approved by the Engineer in the field.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



UNSIGNALIZED MIDBLOCK HIGH-VISIBILITY LONGITUDINAL CROSSWALK

NOTES:

1. Use stop bars with Stop Here For Pedestrians (R1-5b) signs at unsignalized midblock cross walks.
2. Use stop bars with STOP HERE ON RED (R10-6 or R10-6a) signs at mid block crosswalks controlled by traffic signals or pedestrian hybrid beacons.

Texas Department of Transportation

Traffic Safety Division Standard

CROSSWALK PAVEMENT MARKINGS

PM(4)-22A

FILE: pm4-22a.dgn	DN:	CK:	DW:	CK:
© TxDOT December 2022	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
6-20	DIST	COUNTY		SHEET NO.
6-22	AUS	HAYS		246
12-22				

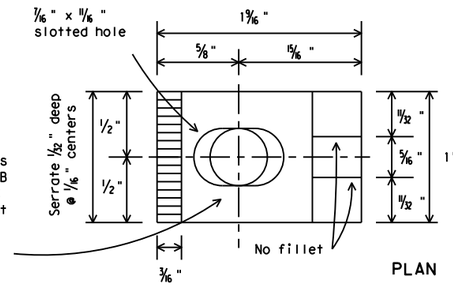
22D

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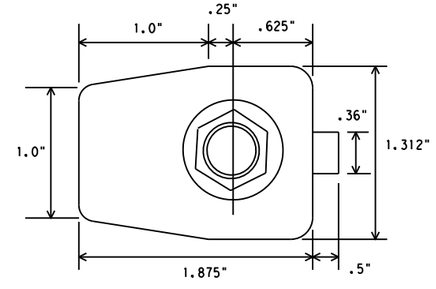
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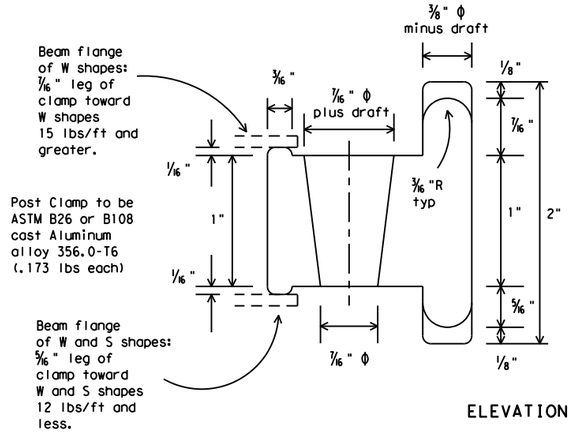
NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.



PLAN

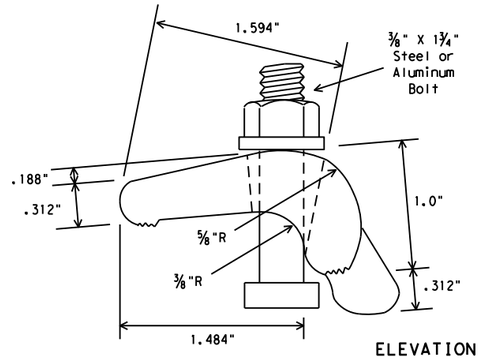


PLAN



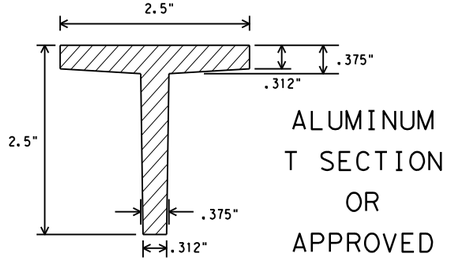
ELEVATION

POST CLAMP DETAIL



ELEVATION

ALTERNATE POST CLAMP DETAIL

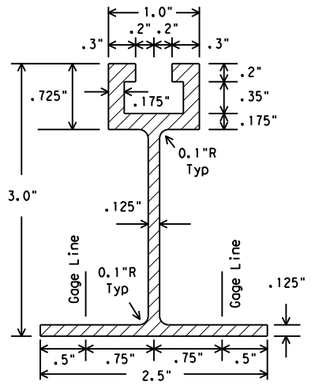


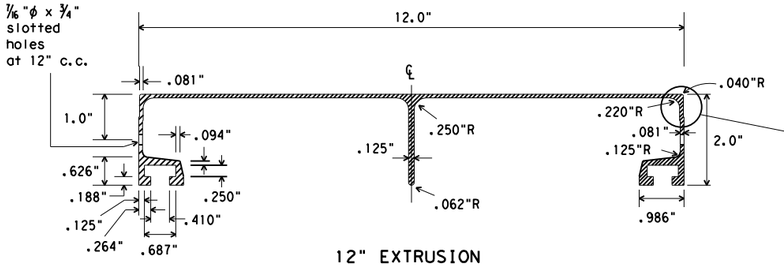
1.912 lbs/ft

ALUMINUM T SECTION OR APPROVED ALTERNATIVE

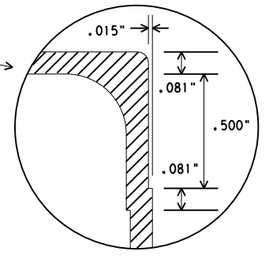
WINDBEAM CROSS SECTION

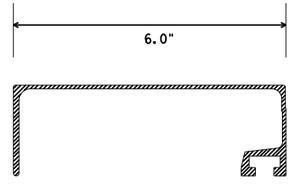
Windbeam to be extruded aluminum (1.175 lbs/ft) or approved alternative





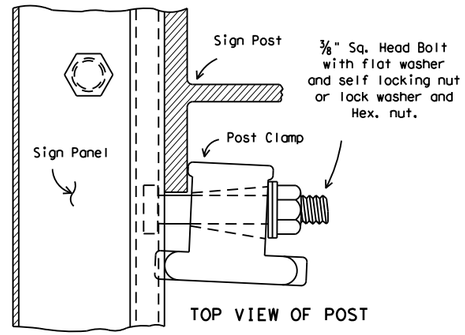
12" EXTRUSION



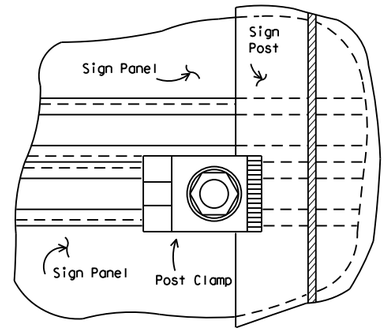


6" EXTRUSION

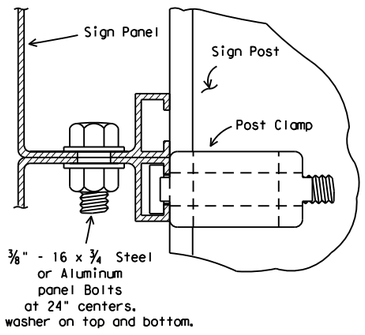
ALUMINUM SIGN PANEL EXTRUSION DETAILS



TOP VIEW OF POST

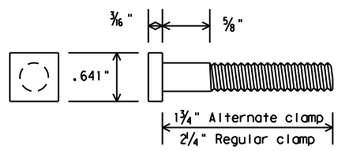


TOP VIEW OF CLAMP



SIDE VIEW OF PANELS

CONNECTION DETAILS



POST CLAMP BOLT DETAIL

DEPARTMENTAL MATERIAL SPECIFICATIONS

SIGN HARDWARE	DMS-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall be "low-alloy steel" for non-bridge structures per Item 442, "Metal For Structures."
4. For fiberglass substrate connection details, see manufacturer's recommendations.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS- EXTRUDED ALUMINUM SIGN PANELS & HARDWARE

SMD(2-1)-08

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DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
CONT	SECT	JOB	HIGHWAY
			HILLSIDE TER
DIST	COUNTY		SHEET NO.
AUS	HAYS		247

9-08 REVISIONS

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SIGN SUPPORT DESCRIPTIVE CODES

(Descriptive Codes correspond to project estimate and quantities sheets)

SM RD SGN ASSM TY XXXXX(X)XX(X-XXXX)

Post Type

FRP = Fiberglass Reinforced Plastic Pipe (see SMD(FRP))
TWT = Thin-Walled Tubing (see SMD(TWT))
10BWG = 10 BWG Tubing (see SMD(SLIP-1) to (SLIP-3))
S80 = Schedule 80 Pipe (see SMD(SLIP-1) to (SLIP-3))

Number of Posts (1 or 2)

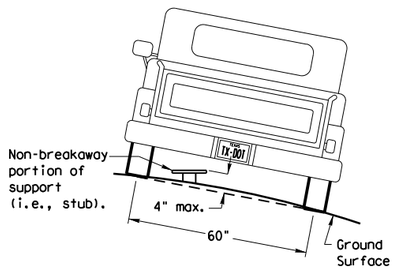
Anchor Type

UA = Universal Anchor - Concreted (see SMD(FRP) and (TWT))
UB = Universal Anchor - Bolted down (see SMD(FRP) and (TWT))
WS = Wedge Anchor Steel - (see SMD(TWT))
WP = Wedge Anchor Plastic (see SMD(TWT))
SA = Slipbase - Concreted (see SMD(SLIP-1) to (SLIP-3))
SB = Slipbase - Bolted Down (see SMD(SLIP-1) to (SLIP-3))

Sign Mounting Designation

P = Prefab. "Plain" (see SMD(SLIP-1) to (SLIP-3), (TWT), (FRP))
T = Prefab. "T" (see SMD(SLIP-1) to (SLIP-3), (TWT))
U = Prefab. "U" (see SMD(SLIP-1) to (SLIP-3))
IF REQUIRED
1EXT or 2EXT = Number of Extensions (see SMD(SLIP-1) to (SLIP-3), (TWT))
BM = Extruded Wind Beam (see SMD(SLIP-1) to (SLIP-3))
WC = 1.12 #/ft Wing Channel (see SMD(SLIP-1) to (SLIP-3))
EXAL = Extruded Aluminum Sign Panels (see SMD(SLIP-1))

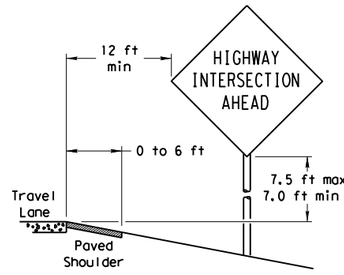
REQUIRED CLEARANCE FOR BREAKAWAY SUPPORT



To avoid vehicle undercarriage snagging, any substantial remains of a breakaway support, when it is broken away, should not project more than 4 inches above a 60-inch chord (i.e., typical space between wheel paths).

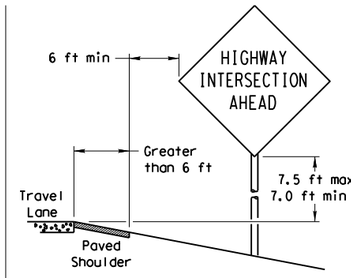
SIGN LOCATION

PAVED SHOULDERS



LESS THAN 6 FT. WIDE

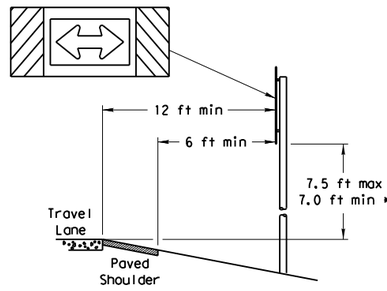
When the shoulder is 6 ft. or less in width, the sign must be placed at least 12 ft. from the edge of the travel lane.



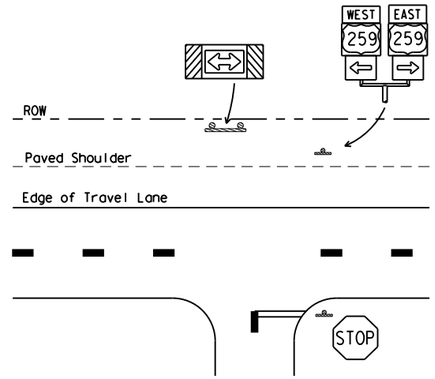
GREATER THAN 6 FT. WIDE

When the shoulder is greater than 6 ft in width, the sign must be placed at least 6 ft. from the edge of the shoulder.

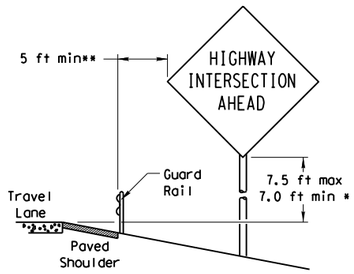
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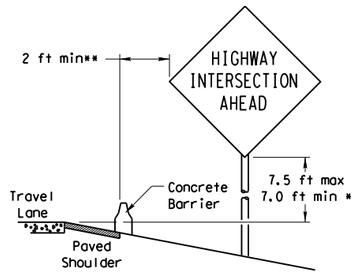
When this sign is needed at the end of a two-lane, two way roadway, the right edge of the sign should be in line with the centerline of the roadway. Place as close to ROW as practical.



BEHIND BARRIER



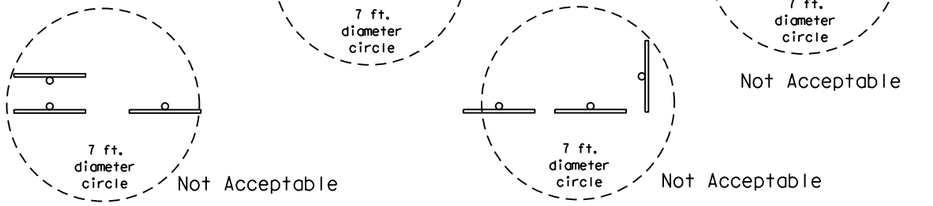
BEHIND GUARDRAIL



BEHIND CONCRETE BARRIER

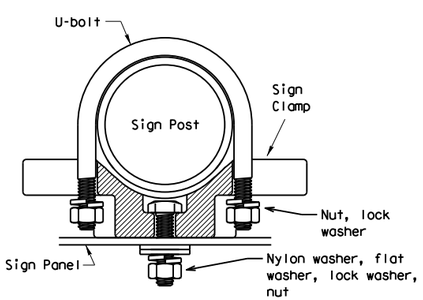
**Sign clearance based on distance required for proper guard rail or concrete barrier performance.

No more than 2 sign posts should be located within a 7 ft. circle.



TYPICAL SIGN ATTACHMENT DETAIL

Single Signs

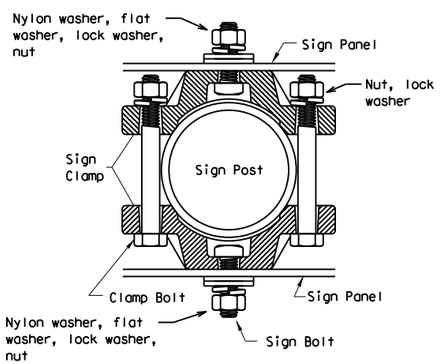


Bolts used to mount sign panels to the clamp are 5/16-18 UNC galvanized square head with nut, nylon washer, flat washer and lock washer. The bolt length is 1 inch for aluminum.

When two sign clamps are used to mount signs back-to-back, use a 5/16-18 UNC galvanized hex head per ASTM A307 with nut and helical-spring lock washer. The approximate bolt lengths for various post sizes and sign clamp types are given in the table at right. The bolt length may need to be adjusted depending upon field conditions.

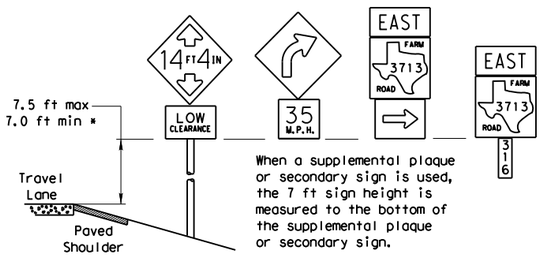
Sign clamps may be either the specific size clamp or the universal clamp.

Back-to-Back Signs



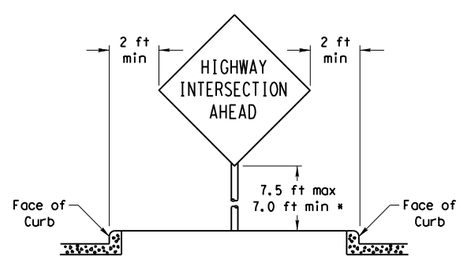
Pipe Diameter	Approximate Bolt Length	
	Specific Clamp	Universal Clamp
2" nominal	3"	3 or 3 1/2"
2 1/2" nominal	3 or 3 1/2"	3 1/2 or 4"
3" nominal	3 1/2 or 4"	4 1/2"

SIGNS WITH PLAQUES



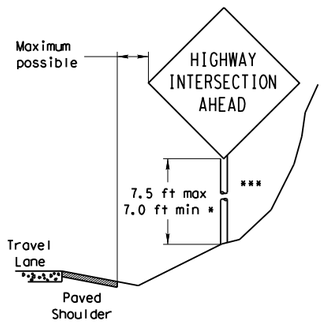
When a supplemental plaque or secondary sign is used, the 7 ft sign height is measured to the bottom of the supplemental plaque or secondary sign.

CURB & GUTTER OR RAISED ISLAND



RESTRICTED RIGHT-OF-WAY

(When 6 ft min. is not possible.)



Right-of-way restrictions may be created by rocks, water, vegetation, forest, buildings, a narrow island, or other factors.

In situations where a lateral restriction prevents the minimum horizontal clearance from the edge of the travel lane, signs should be placed as far from the travel lane as practical.

*** Post may be shorter if protected by guardrail or if Engineer determines the post could not be hit due to extreme slope.

* Signs shall be mounted using the following condition that results in the greatest sign elevation:

(1) a minimum of 7 to a maximum of 7.5 feet above the edge of the travel lane or

(2) a minimum of 7 to a maximum of 7.5 feet above the grade at the base of the support when sign is installed on the backslope.

The maximum values may be increased when directed by the Engineer.

See the Traffic Operations Division website for detailed drawings of sign clamps, Triangular Slipbase System components and Wedge Anchor System components.

The website address is:
http://www.txdot.gov/publications/traffic.htm

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS GENERAL NOTES & DETAILS

SMD(GEN)-08

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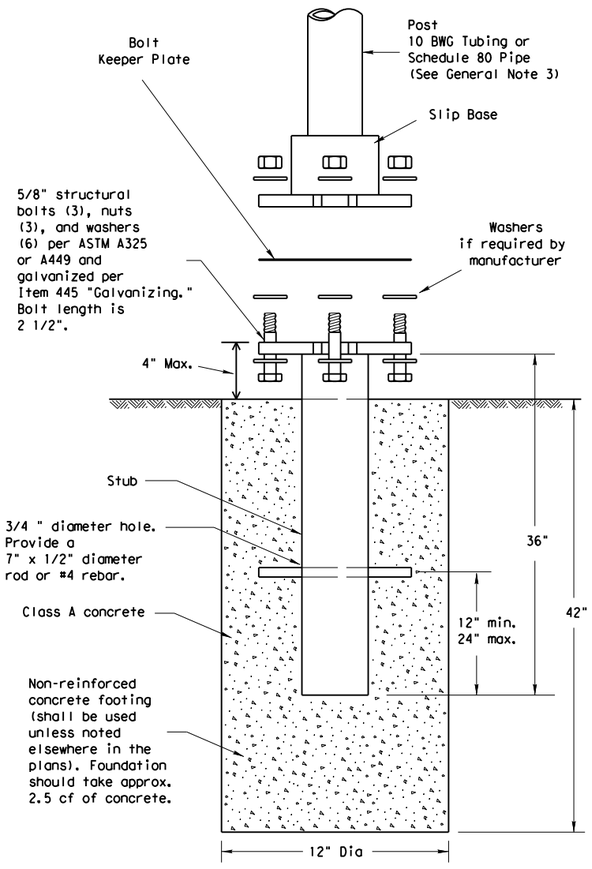
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AUS	HAYS		248

9-08 REVISIONS

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TRIANGULAR SLIPBASE INSTALLATION GENERAL REQUIREMENTS



SM RD SGN ASSM TY XXXXX(X)SA(X-XXXX)

NOTE

There are various devices approved for the Triangular Slipbase System. Please reference the Material Producer List for approved slip base systems. http://www.txdot.gov/business/producer_list.htm The devices shall be installed per manufacturers' recommendations. Installation procedures shall be provided to the Engineer by Contractor.

GENERAL NOTES:

1. Slip base shall be permanently marked to indicate manufacturer. Method, design, and location of marking are subject to approval of the TxDOT Traffic Standards Engineer.
2. Material used as post with this system shall conform to the following specifications:
   10 BWG Tubing (2.875" outside diameter)
   - 0.134" nominal wall thickness
   - Seamless or electric-resistance welded steel tubing or pipe
   - Steel shall be HSLAS Gr 55 per ASTM A1011 or ASTM A1008
   - Other steels may be used if they meet the following:
     - 55,000 PSI minimum yield strength
     - 70,000 PSI minimum tensile strength
     - 20% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.122" to 0.138"
   - Outside diameter (uncoated) shall be within the range of 2.867" to 2.883"
   - Galvanization per ASTM A123 or ASTM A653 G210. For precoated steel tubing (ASTM A653), recoat tube outside diameter weld seam by metallizing with zinc wire per ASTM B833.

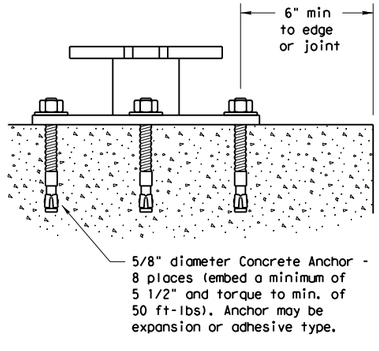
   Schedule 80 Pipe (2.875" outside diameter)
   - 0.276" nominal wall thickness
   - Steel tubing per ASTM A500 Gr C
   - Other seamless or electric-resistance welded steel tubing or pipe with equivalent outside diameter and wall thickness may be used if they meet the following:
     - 46,000 PSI minimum yield strength
     - 62,000 PSI minimum tensile strength
     - 21% minimum elongation in 2"
   - Wall thickness (uncoated) shall be within the range of 0.248" to 0.304"
   - Outside diameter (uncoated) shall be within the range of 2.855" to 2.895"
   - Galvanization per ASTM A123
3. See the Traffic Operations Division website for detailed drawings of sign clamps and Texas Universal Triangular Slipbase System components. The website address is: http://www.txdot.gov/publications/traffic.htm
4. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.

ASSEMBLY PROCEDURE

Foundation
1. Prepare 12-inch diameter by 42-inch deep hole. If solid rock is encountered, the depth of the foundation may be reduced such that it is embedded a minimum of 18 inches into the solid rock.
2. The Engineer may permit batches of concrete less than 2 cubic yards to be mixed with a portable, motor-driven concrete mixer. For small placements less than 0.5 cubic yards, hand mixing in a suitable container may be allowed by Engineer. Concrete shall be Class A.
3. Push the pipe end of the slip base stub into the center of the concrete. Rotate the stub back and forth while pushing it down into the concrete to assure good contact between the concrete and stub. Continue to work the stub into the concrete until it is between 2 to 4 inches above the ground.
4. Plumb the stub. Allow a minimum of 4 days to set, unless otherwise directed by the Engineer.
5. The triangular slipbase system is multidirectional and is designed to release when struck from any direction.

Support
1. Cut support so that the bottom of the sign will be 7 to 7.5 feet above the edge of the travelway (i.e., edge of the closest lane) when slip plate is below the edge of pavement or 7 to 7.5 feet above slip plate when the slip plate is above the edge of the travelway. The cut shall be plumb and straight.
2. Attach sign to support using connections shown. When multiple signs are installed on the same support, ensure the minimum clearance between each sign is maintained. See SMD(SLIP-2) for clearances based on sign types.

CONCRETE ANCHOR



SM RD SGN ASSM TY XXXXX(X)SB(X-XXXX)

Concrete anchor consists of 5/8" diameter stud bolt with UNC series bolt threads on the upper end. Heavy hex nut per ASTM A563, and hardened washer per ASTM F436. The stud bolt shall have a minimum yield and ultimate tensile strength of 50 and 75 KSI, respectively. Nuts, bolts and washers shall be galvanized per Item 445, "Galvanizing." Adhesive type anchors shall have stud bolts installed with Type III epoxy per DMS-6100, "Epoxies and Adhesives." Adhesive anchors may be loaded after adequate epoxy cure time per the manufacturer's recommendations. Top of bolt shall extend at least flush with top of the nut when installed. The anchor, when installed in 4000 psi normal-weight concrete with a 5 1/2" minimum embedment, shall have a minimum allowable tension and shear of 3900 and 3100 psi, respectively.

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-1)-08

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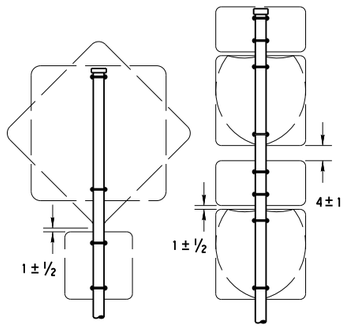
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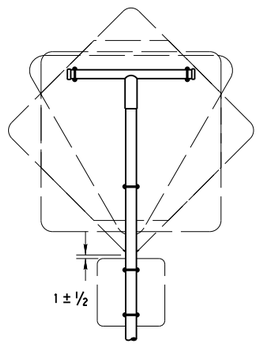
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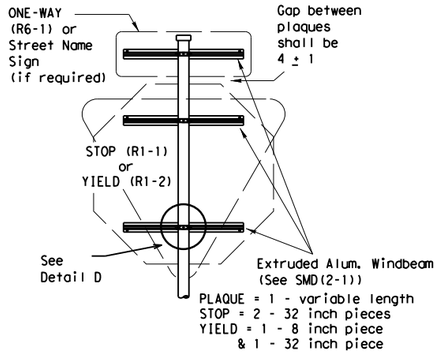
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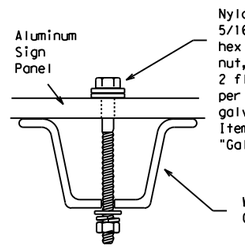
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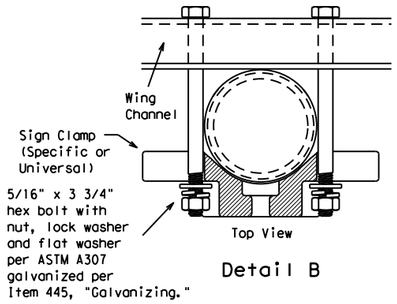
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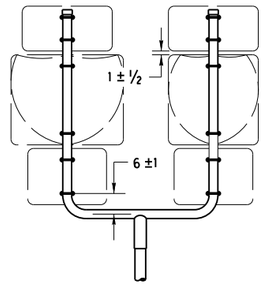
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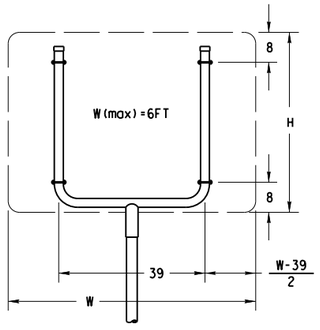
Detail A



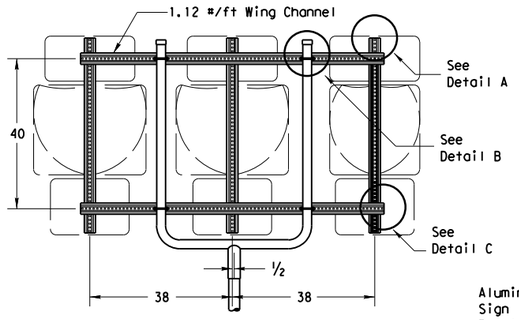
Detail B



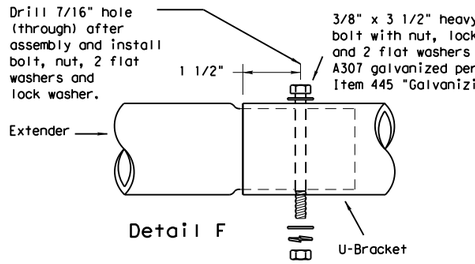
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SM RD SGN ASSM TY XXXXX(1)XX(U)

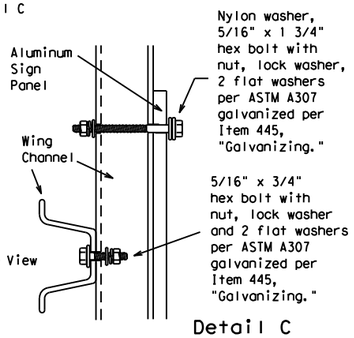


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(See Note 11)

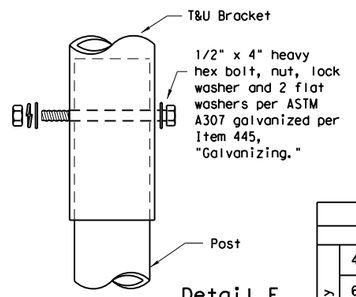


Detail F

Splices shall only be allowed behind the sign substrate.

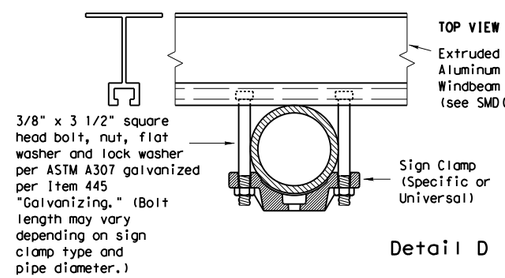


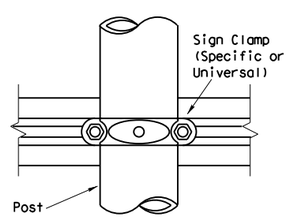
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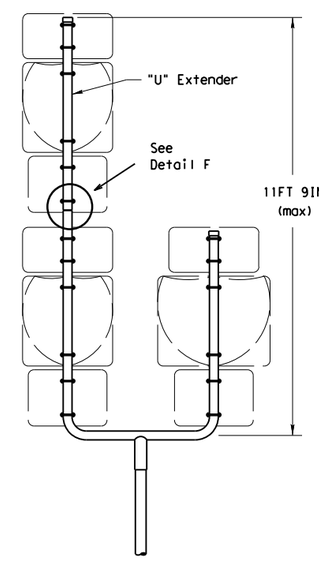
Detail E

SIDE VIEW

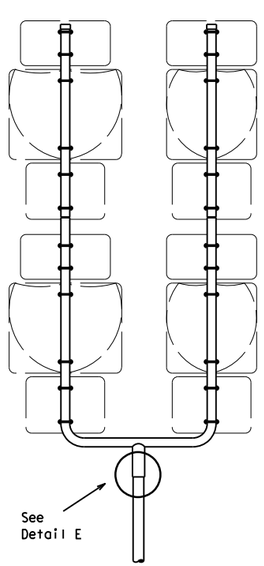




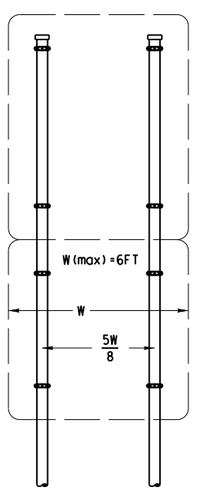
Detail D



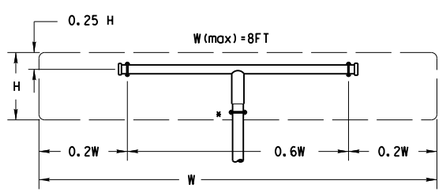
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SM RD SGN ASSM TY S80(1)XX(U-2EXT)



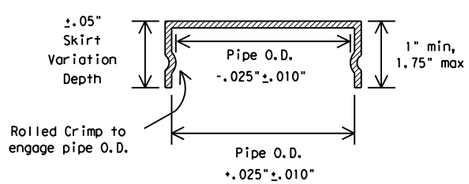
SM RD SGN ASSYM TY XXXXX(2)XX(P)



SM RD SGN ASSM TY XXXXX(1)XX(T)
(* - See Note 12)

All dimensions are in english unless detailed otherwise.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 gauge for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

1.

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

2. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
3. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
4. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
5. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
6. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
7. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
8. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
9. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
10. Additional route markers may be added vertically, provided the total sign area does not exceed the maximum allowable amount per Note 1.
11. Additional sign clamp required on the "T-bracket" post for 24 inch height signs. Place the clamp 3 inches above bottom of sign when possible.
12. Post open ends shall be fitted with Friction Caps.
13. Sign blanks shall be the sizes and shapes shown on the plans.

REQUIRED SUPPORT

	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-2)-08

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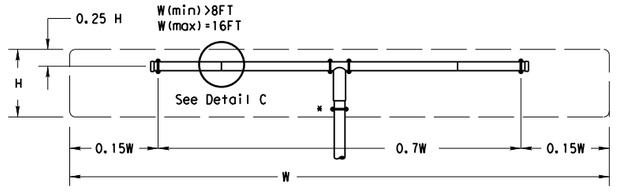
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				HILLSIDE TER

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AUS	HAYS	250

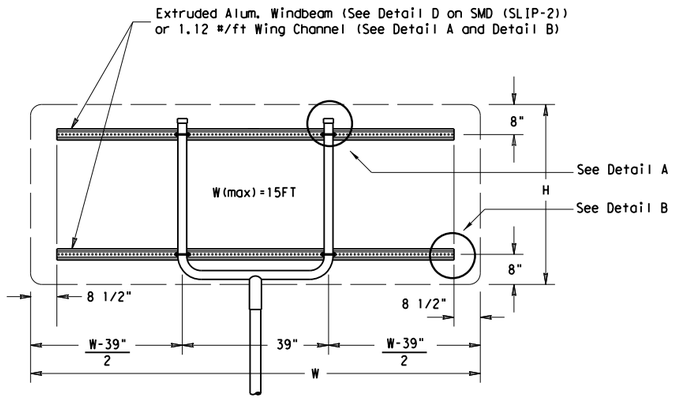
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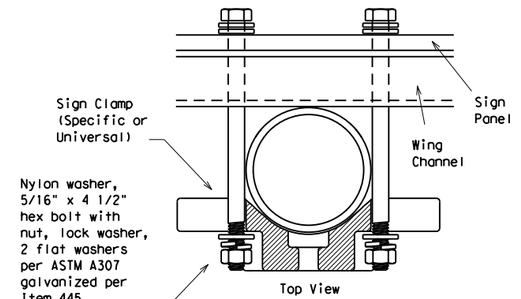
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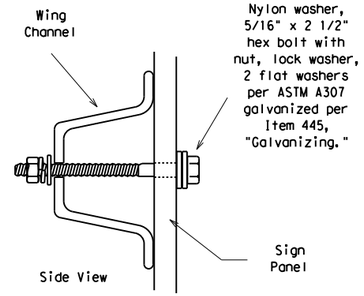
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(* - See Note 12)



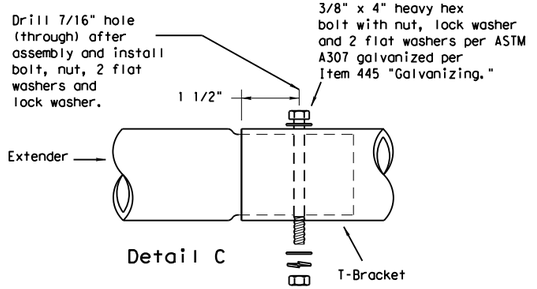
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Detail A

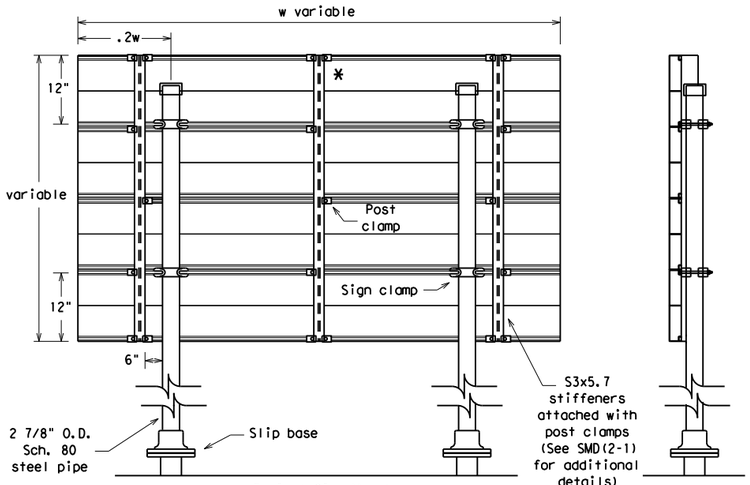


Detail B



Detail C

Splices shall only be allowed behind the sign substrate.

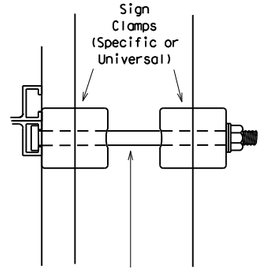


Typical Sign Mount

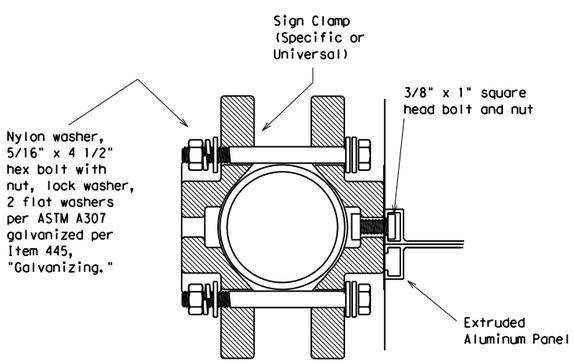
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* Additional stiffener placed at approximate center of signs when sign width is greater than 10'.

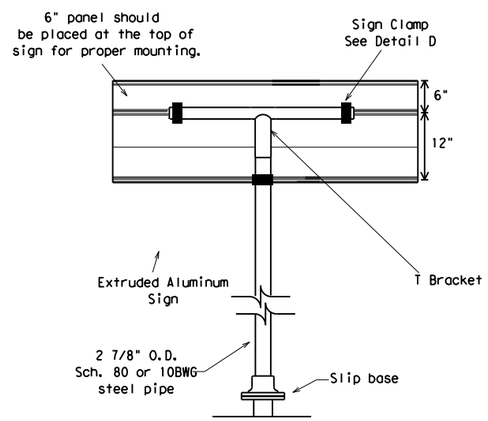
See Detail E
for clamp installation



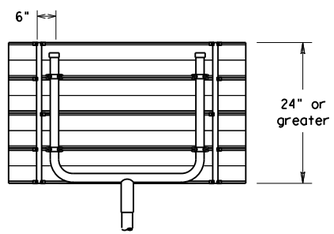
Detail E



Detail D
EXTRUDED ALUMINUM SIGN WITH T BRACKET



Extruded Aluminum Sign
With T Bracket



Use Extruded Alum. Windbeam as stiffeners
See SMD (2-1) for additional details

See Detail E
for clamp installation

GENERAL NOTES:

SIGN SUPPORT	# OF POSTS	MAX. SIGN AREA
10 BWG	1	16 SF
10 BWG	2	32 SF
Sch 80	1	32 SF
Sch 80	2	64 SF

1. The Engineer may require that a Schedule 80 post be used in place of a 10 BWG where a sign height is abnormally high due to a fill slope.
2. Sign supports shall not be spliced except where shown. Sign support posts shall not be spliced.
3. Aluminum sign blanks shall conform to Departmental Material Specifications DMS-7110 and shall have the following minimum thicknesses: 0.080 for signs less than 7.5 sq. ft., 0.100 for signs 7.5 to 15 sq. ft., and 0.125 for signs greater than 15 sq. ft.
4. Signs that require specific supports due to reasons in addition to windloading are indicated on the "REQUIRED SUPPORT" table on this sheet.
5. For horizontal rectangular signs fabricated from flat aluminum, T-brackets are used for signs 24 inches or less in height. U-brackets are used for signs of greater height.
6. When two triangular slipbase supports are used to support a single sign, they shall not be "rigidly" connected to each other except through the sign panel. This will allow each support to act independently when impacted by an errant vehicle.
7. Wing channel shall meet ASTM A 1011 SS Gr 50 and be galvanized per ASTM A 123.
8. Excess pipe, wing channel, or windbeam shall be cut off so that it does not extend beyond the sign panel (i.e., excess support shall not be visible when the sign is viewed from the front.) Repair galvanized coating at cut support ends per Item 445, "Galvanizing."
9. Sign blanks shall be the sizes and shapes shown on the plans.
10. Additional sign clamp required on the "T-bracket" post for 24 inch high signs. Place the clamp 3 inches above bottom of sign when possible.
11. Post open ends shall be fitted with Friction Caps.

REQUIRED SUPPORT		
	SIGN DESCRIPTION	SUPPORT
Regulatory	48-inch STOP sign (R1-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	60-inch YIELD sign (R1-2)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	48x16-inch ONE-WAY sign (R6-1)	TY 10BWG(1)XX(T) TY 10BWG(1)XX(P-BM)
	36x48, 48x36, and 48x48-inch signs	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
Warning	48x48-inch signs (diamond or square)	TY 10BWG(1)XX(T)
	48x60-inch signs	TY S80(1)XX(T)
	48-inch Advance School X-ing sign (S1-1)	TY 10BWG(1)XX(T)
	48-inch School X-ing sign (S2-1)	TY 10BWG(1)XX(T)
	Large Arrow sign (W1-6 & W1-7)	TY 10BWG(1)XX(T)

Texas Department of Transportation
Traffic Operations Division

SIGN MOUNTING DETAILS
SMALL ROADSIDE SIGNS
TRIANGULAR SLIPBASE SYSTEM

SMD(SLIP-3)-08

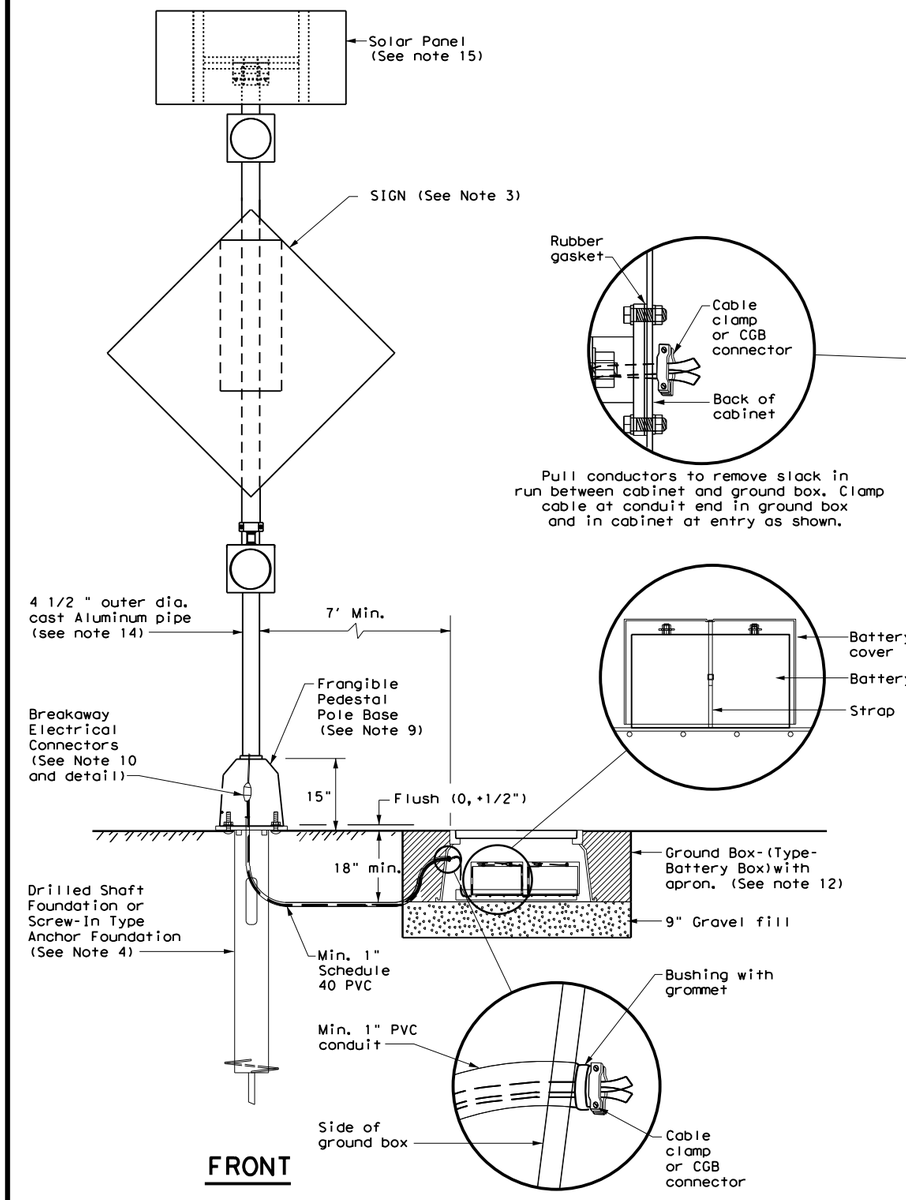
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REVISIONS	DN: TXDOT	CK: TXDOT	DW: TXDOT	CK: TXDOT
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				HILLSIDE TER
	DIST	COUNTY		SHEET NO.
	AUS	HAYS		251

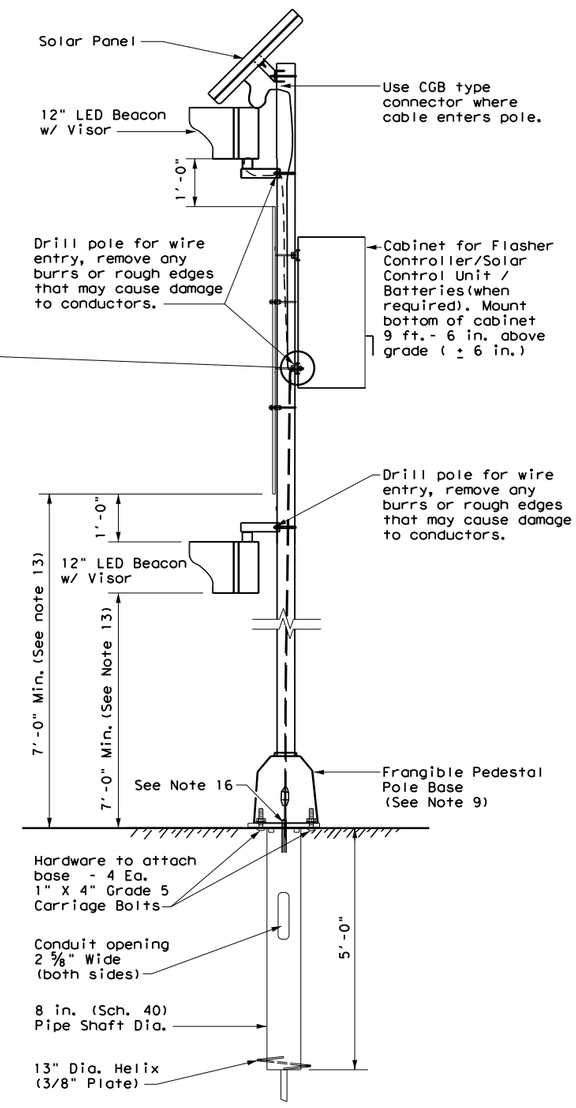
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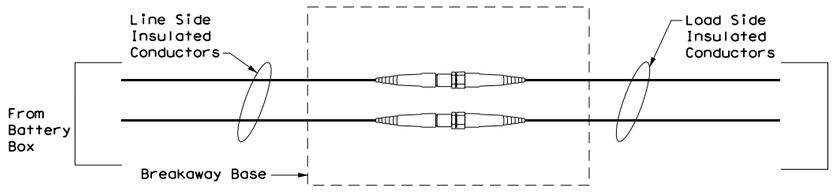
GENERAL NOTES:

1. Details show a typical warning sign with two flashing beacon heads, other arrangements are possible. When only one beacon is required, install the upper beacon.
2. See Item 685, "Roadside Flashing Beacon Assemblies" for further requirements.
3. See SMD standard sheets for lateral and vertical clearances and sign mounting details. Install signs as shown on the sign layout sheets.
4. Use either a Screw-In Type Anchor Foundation or a Drilled Shaft Foundation as shown elsewhere in the plans. When plans require a Drilled Shaft Foundation, see standard sheet TS-FD. Install the Screw-In Type Anchor Foundation as per manufacturer's recommendations. On a slope, install one edge at ground level. Screw-In/Drilled Shaft Foundation is subsidiary to Item 685. Installation of a ground rod is not required for solar powered flashing beacon assemblies.
5. When used, provide Screw-In Type Anchor Foundations as shown on TxDOT's Material Producer List (MPL) in the file "Highway Traffic Signals".
6. Use materials specifically designed for attaching cabinets, beacon heads, solar panels, etc., to poles.
7. Install beacon heads as shown here, as shown elsewhere on the plans, or as directed. Use hardware specifically designed for mounting beacon heads on poles.
8. Conduit in foundation and within 6 in. of foundation is subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies."
9. Per manufacturer's recommendations, engage all threads on the pedestal pole base and pipe unless the pipe is fully seated into base. In high winds, use a pole and base collar assembly to add strength and prevent loosening on connection.
10. Provide single pole non-fused watertight breakaway electrical connectors for frangible pedestal pole bases, as shown on TxDOT's MPL in the file "Roadway Illumination and Electrical Supplies." Approved models are listed under Item 685. For ungrounded (hot) conductors, install a breakaway connector with a dummy fuse slug). For grounded (neutral) conductors, install a breakaway connector with a white colored marking and a permanently installed dummy fuse (slug).
11. Install the batteries in a battery box. Place the batteries on a 3/16" thick plastic sheet and connect together. Place a plastic cover (battery bell jar) over the top of each battery and secure the battery bell jar to the battery with a strap. The batteries, bell jars, straps and 3/16" plastic sheet are subsidiary to the Item 685, "Roadside Flashing Beacon Assemblies." When required, install batteries in the flasher cabinet. Wire batteries according to manufacturers recommendations. Provide the number of batteries as required by the manufacturer.
12. See standard sheet Electrical Details (ED) for additional requirements regarding the installation of ground boxes/battery boxes, conduit, and cabinets.
13. Provide clearance as shown above the sidewalk or pavement grade at the edge of the road. When a bottom beacon is not used, mount the bottom of the sign at least 7 ft. above the sidewalk or pavement grade at the edge of the road.
14. Unless otherwise shown on the plans, pole shaft shall be one piece, Schedule 40 Aluminum pipe, ASTM B429 or B221 (Alloy 6061-T6 only). Aluminum conduit will not develop the necessary strength and will not be allowed.
15. Orient solar panel for optimum exposure to sunlight (face to the south). Prior to installation, check the location to ensure there is no overhead obstruction that would block the solar panel from receiving full sunlight. Unless specified elsewhere, mount a minimum of 14' above grade.
16. Ensure height of conduit is below top of anchor bolts.

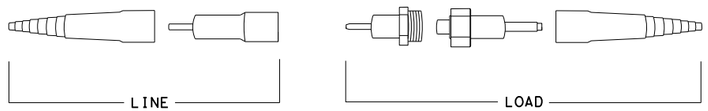


Pull conductors to remove slack in run between cabinet and ground box. Clamp cable at conduit end in ground box and in cabinet at entry as shown.





NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS



NON-FUSED BREAKAWAY ELECTRICAL CONNECTORS
EXPLODED VIEW

Texas Department of Transportation

Traffic Operations Division Standard

SOLAR POWERED ROADSIDE FLASHING BEACON ASSEMBLY DETAILS

SPRFBA(1)-13

FILE: spb1-13.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT May 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
12-04	DIST	COUNTY		SHEET NO.
3-13	AUS	HAYS		252

75A

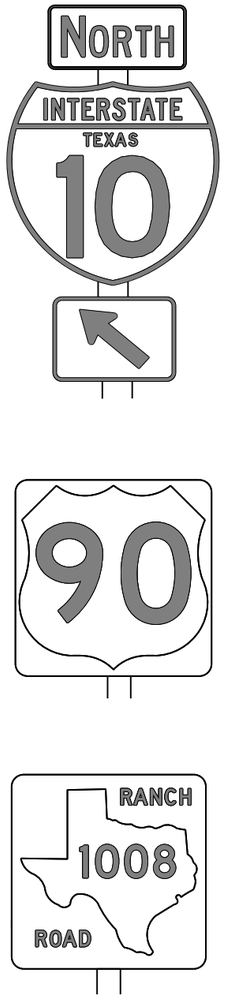
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REQUIREMENTS FOR INDEPENDENT MOUNTED ROUTE SIGNS

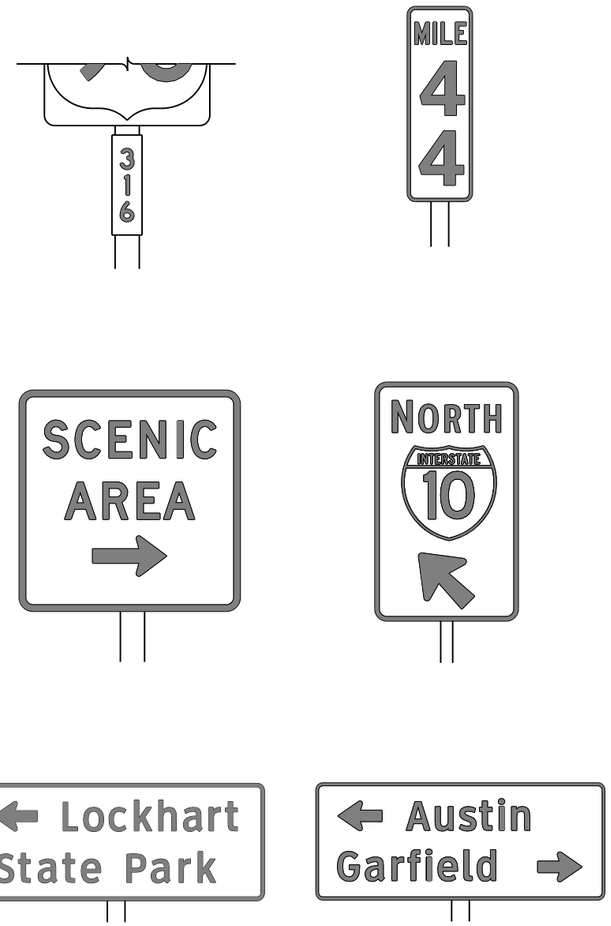
SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE A SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & BORDERS	ALL OTHERS	TYPE B or C SHEETING



TYPICAL EXAMPLES

REQUIREMENTS FOR BLUE, BROWN & GREEN D AND I SERIES GUIDE SIGNS

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	ALL	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE D SHEETING
LEGEND, SYMBOLS & BORDERS	ALL OTHERS	TYPE B OR C SHEETING



TYPICAL EXAMPLES

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).

2. White legend shall use the Clearview Alphabet. The following Clearview fonts shall be used to replace the existing white Federal Highway Administration (FHWA) Standard Highway Alphabets, when not specified in the SHSD, or in the plans.

B	CV-1W
C	CV-2W
D	CV-3W
E	CV-4W
Emod	CV-5WR
F	CV-6W

3. Route sign legend (ie. IH, US, SH and FM shields) shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets B, C, D, E, Emod or F).

4. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.

5. Independent mounted route sign with white or colored legend and borders shall be applied by screening process with transparent color ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof. White legend, symbols and borders on all other signs shall be cut-out white sheeting applied to colored background sheeting.

6. Information regarding borders and radii for signs is found in the "Standard Highway Sign Designs for Texas". Dimensions shown and described for borders and corner radii on parent sign are nominal. Borders may vary in width as much as 1/2 inch. Corner radii above 3 inches may vary in width as much as 1 inch. Borders and corner radii within a parent sign must be of matching widths. The sign area outside the corner radius should be trimmed or rounded.

7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.

8. Mounting details of roadside signs are shown in the "SMD series" Standard Plan Sheets.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(3)-13

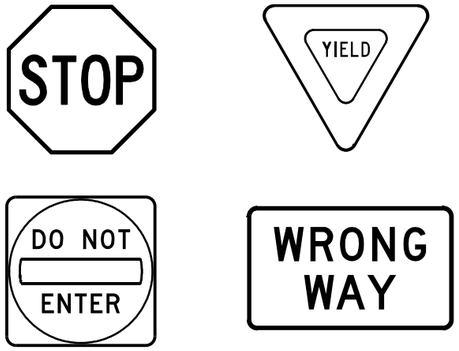
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REVISIONS				HILLSIDE TER
12-03 7-13	DIST	COUNTY		SHEET NO.
9-08	AUS	HAYS		253

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REQUIREMENTS FOR RED BACKGROUND REGULATORY SIGNS

(STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



REQUIREMENTS FOR FOUR SPECIFIC SIGNS ONLY

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	RED	TYPE B OR C SHEETING
BACKGROUND	WHITE	TYPE B OR C SHEETING
LEGEND & BORDERS	WHITE	TYPE B OR C SHEETING
LEGEND	RED	TYPE B OR C SHEETING

REQUIREMENTS FOR WHITE BACKGROUND REGULATORY SIGNS

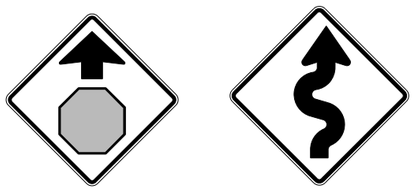
(EXCLUDING STOP, YIELD, DO NOT ENTER AND WRONG WAY SIGNS)



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	ALL OTHERS	TYPE B OR C SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND, BORDERS AND SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR WARNING SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	FLOURESCENT YELLOW	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND & BORDERS	BLACK	ACRYLIC NON-REFLECTIVE FILM
LEGEND & SYMBOLS	ALL OTHER	TYPE B OR C SHEETING

REQUIREMENTS FOR SCHOOL SIGNS



TYPICAL EXAMPLES

SHEETING REQUIREMENTS		
USAGE	COLOR	SIGN FACE MATERIAL
BACKGROUND	WHITE	TYPE A SHEETING
BACKGROUND	FLOURESCENT YELLOW GREEN	TYPE B_{FL} OR C_{FL} SHEETING
LEGEND, BORDERS AND SYMBOLS	BLACK	ACRYLIC NON-REFLECTIVE FILM
SYMBOLS	RED	TYPE B OR C SHEETING

GENERAL NOTES

1. Signs to be furnished shall be as detailed elsewhere in the plans and/or as shown on sign tabulation sheet. Standard sign designs and arrow dimensions can be found in the "Standard Highway Sign Designs for Texas" (SHSD).
2. Sign legend shall use the Federal Highway Administration (FHWA) Standard Highway Alphabets (B, C, D, E, Emod or F).
3. Lateral spacing between letters and numerals shall conform with the SHSD, and any approved changes thereto. Lateral spacing of legend shall provide a balanced appearance when spacing is not shown.
4. Black legend and borders shall be applied by screening process or cut-out acrylic non-reflective black film to background sheeting, or combination thereof.
5. White legend and borders shall be applied by screening process with transparent colored ink, transparent colored overlay film to white background sheeting or cut-out white sheeting to colored background sheeting, or combination thereof.
6. Colored legend shall be applied by screening process with transparent colored ink, transparent colored overlay film or colored sheeting to background sheeting, or combination thereof.
7. Sign substrate shall be any material that meets the Departmental Material Specification requirements of DMS-7110 or approved alternative.
8. Mounting details for roadside mounted signs are shown in the "SMD series" Standard Plan Sheets.

ALUMINUM SIGN BLANKS THICKNESS	
Square Feet	Minimum Thickness
Less than 7.5	0.080
7.5 to 15	0.100
Greater than 15	0.125

DEPARTMENTAL MATERIAL SPECIFICATIONS	
ALUMINUM SIGN BLANKS	DMS-7110
SIGN FACE MATERIALS	DMS-8300

The Standard Highway Sign Designs for Texas (SHSD) can be found at the following website.

http://www.txdot.gov/

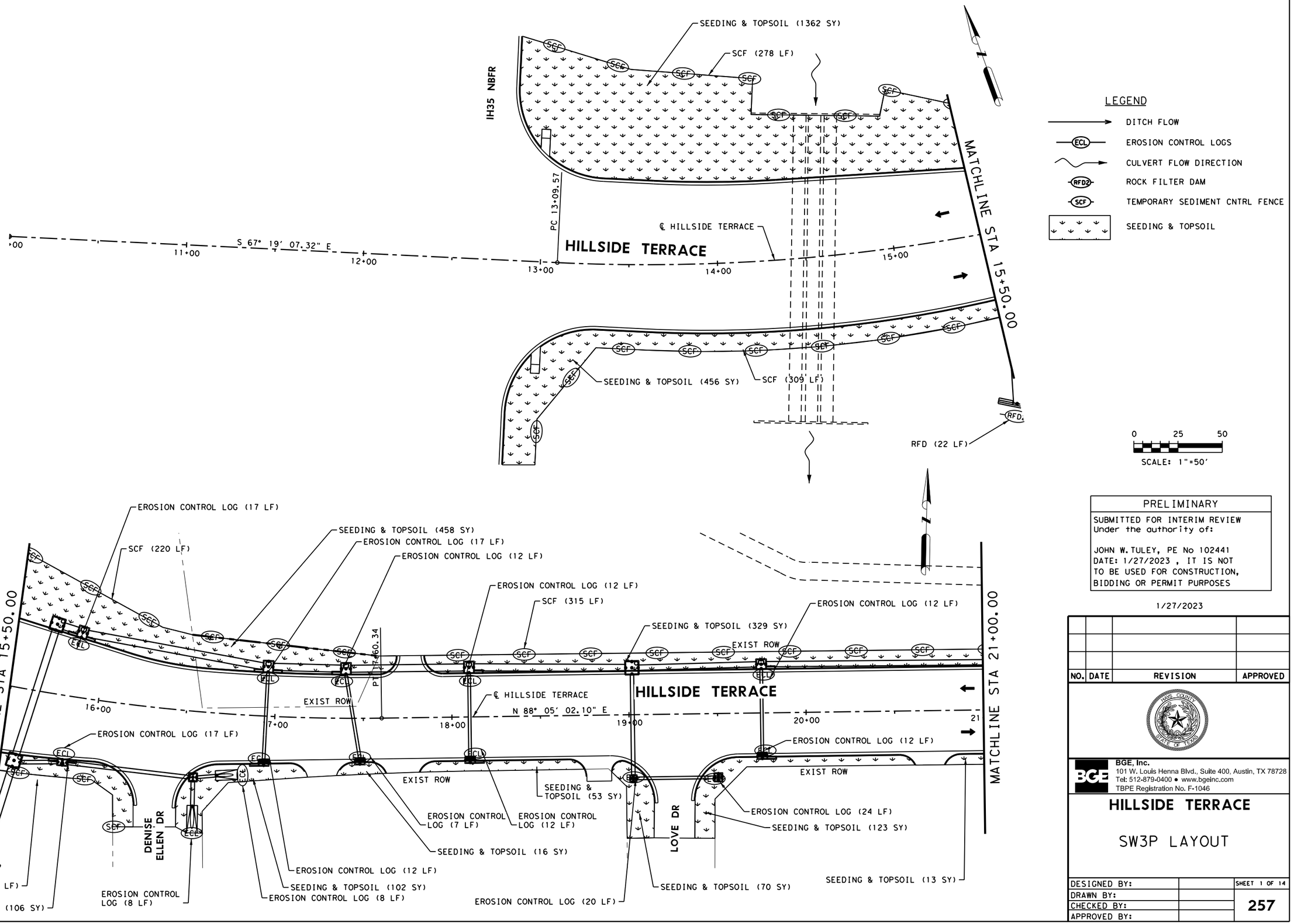
Texas Department of Transportation

Traffic Operations Division Standard

TYPICAL SIGN REQUIREMENTS

TSR(4)-13

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© TxDOT October 2003	CONT	SECT	JOB	HIGHWAY
REVISIONS				HILLSIDE TER
12-03 7-13 9-08	DIST	COUNTY		SHEET NO.
	AUS	HAYS		254



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Under the authority of:

JOHN W. TULEY, PE No 102441
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1/27/2023

NO.	DATE	REVISION	APPROVED

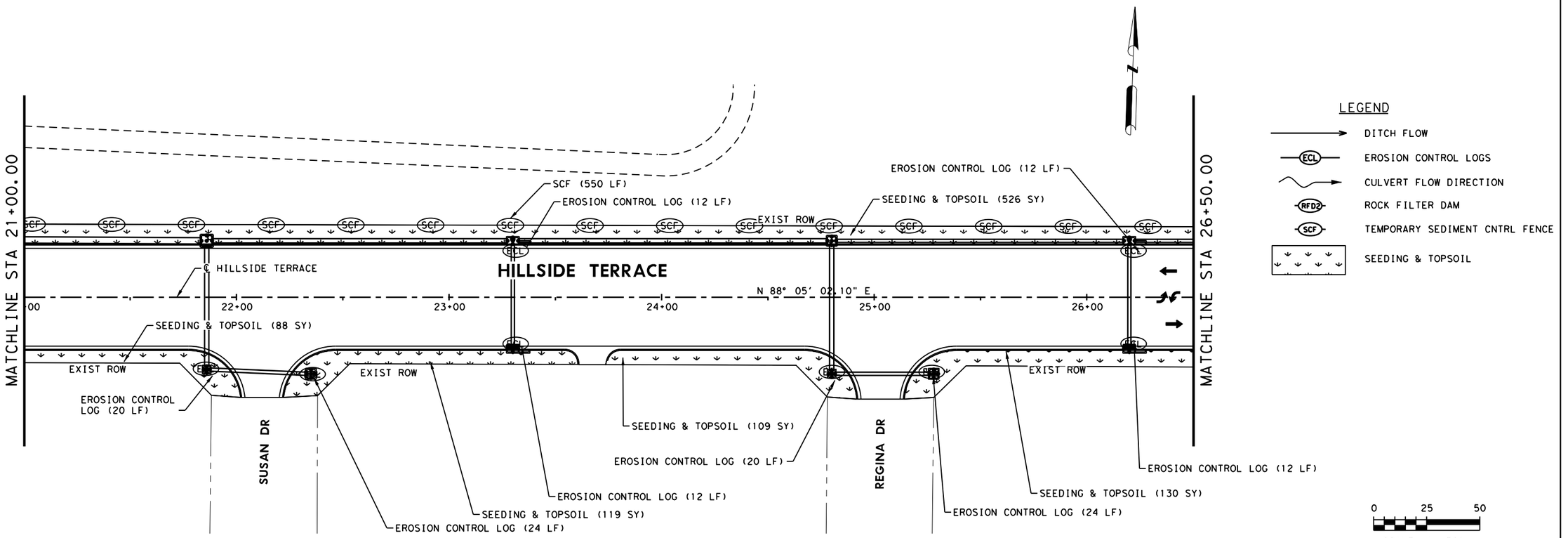
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101 W. Louis Henna Blvd., Suite 400, Austin, TX 78728
Tel: 512-879-0400 • www.bgeinc.com
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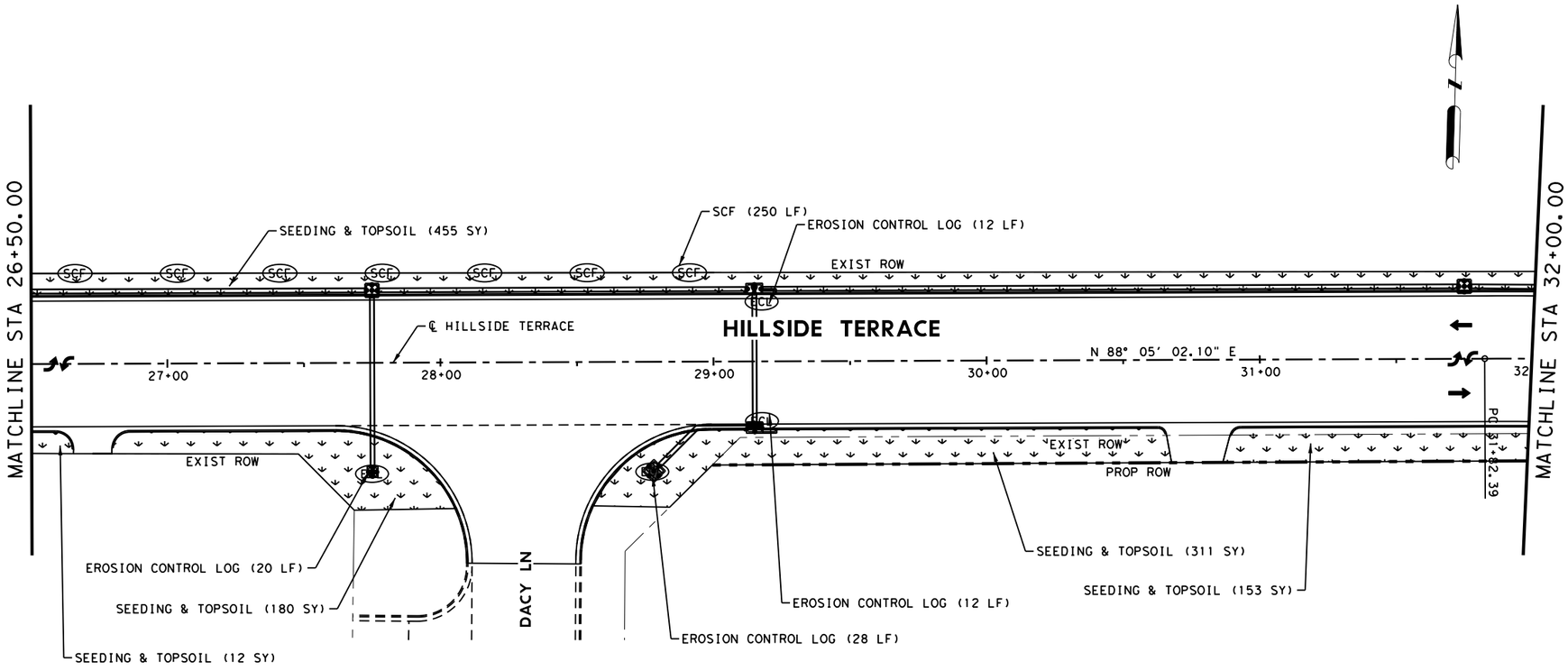
HILLSIDE TERRACE

SW3P LAYOUT

DESIGNED BY:		SHEET 1 OF 14
DRAWN BY:		257
CHECKED BY:		
APPROVED BY:		

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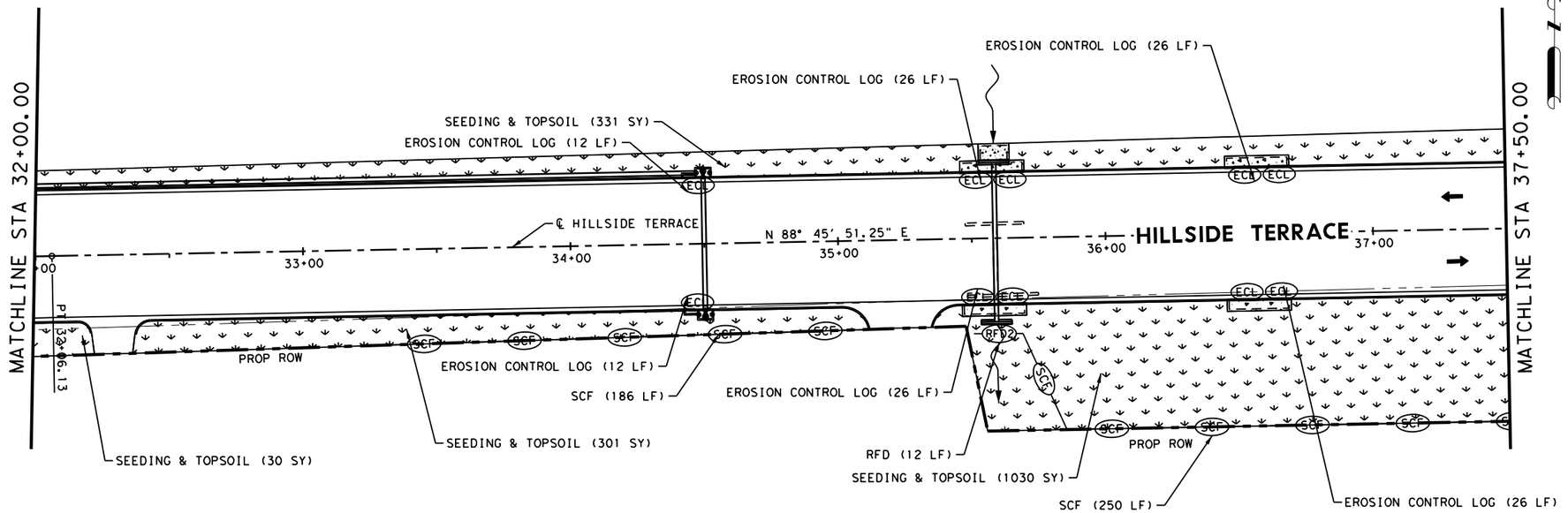
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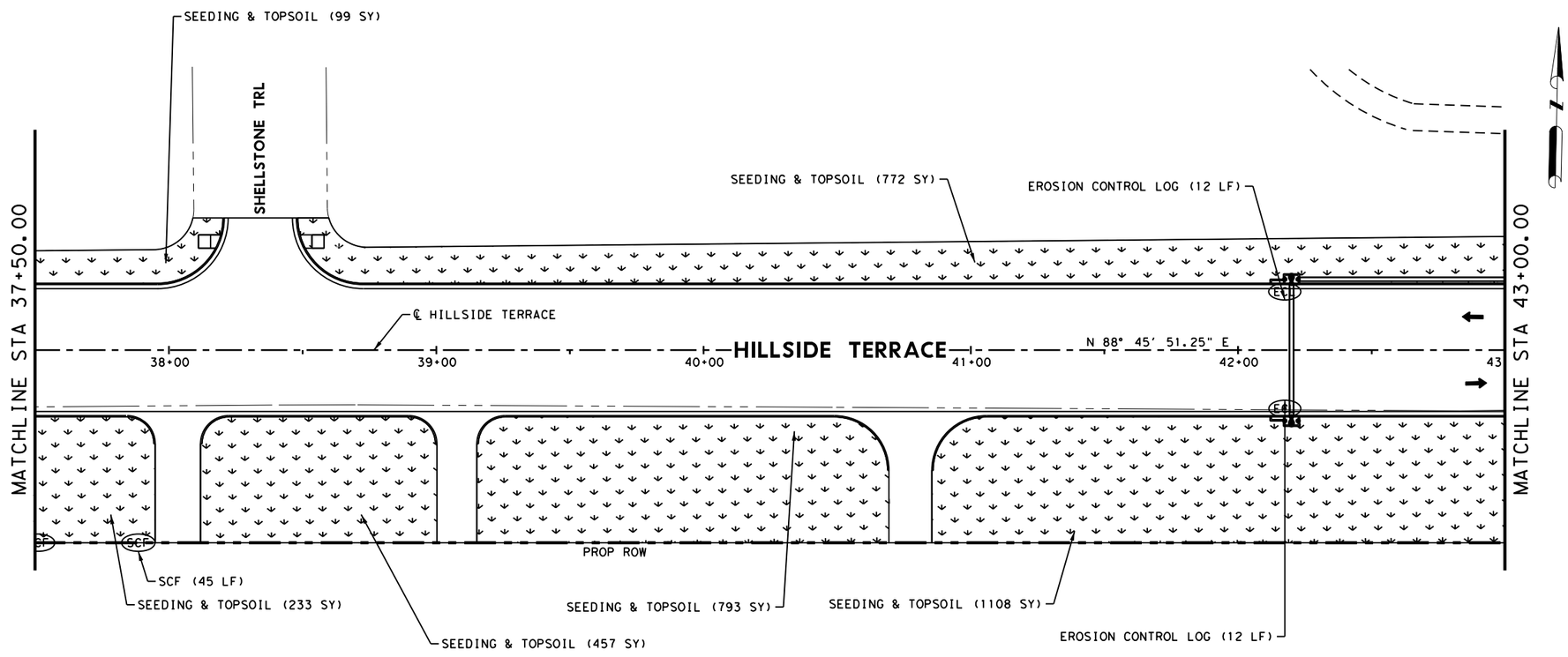
HILLSIDE TERRACE

SW3P LAYOUT

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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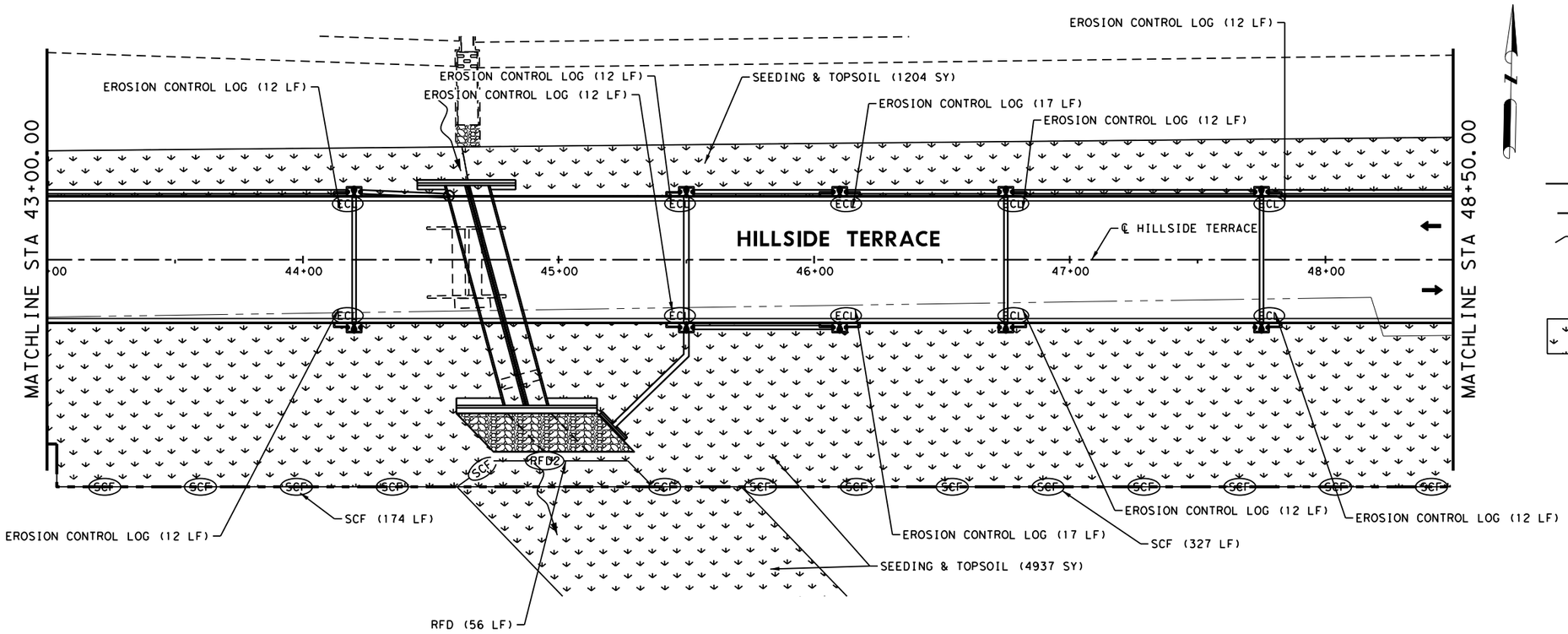
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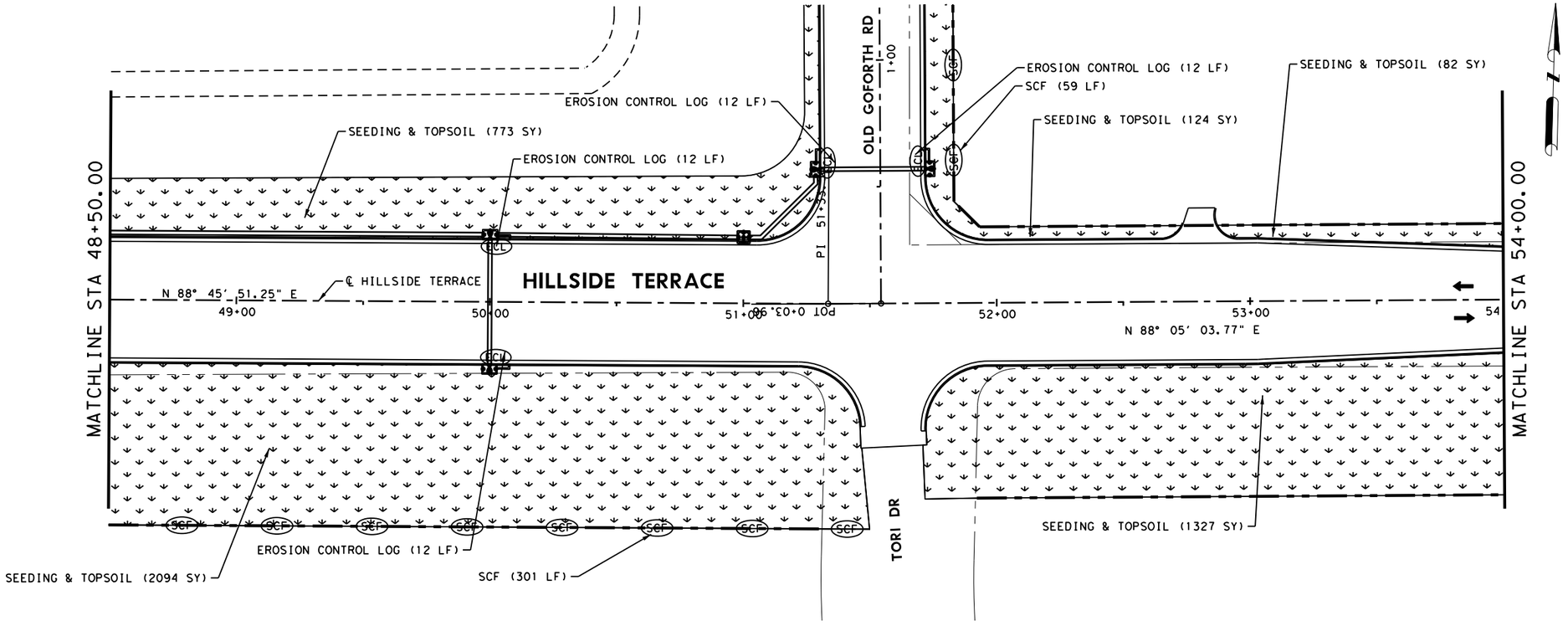
HILLSIDE TERRACE

SW3P LAYOUT

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
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- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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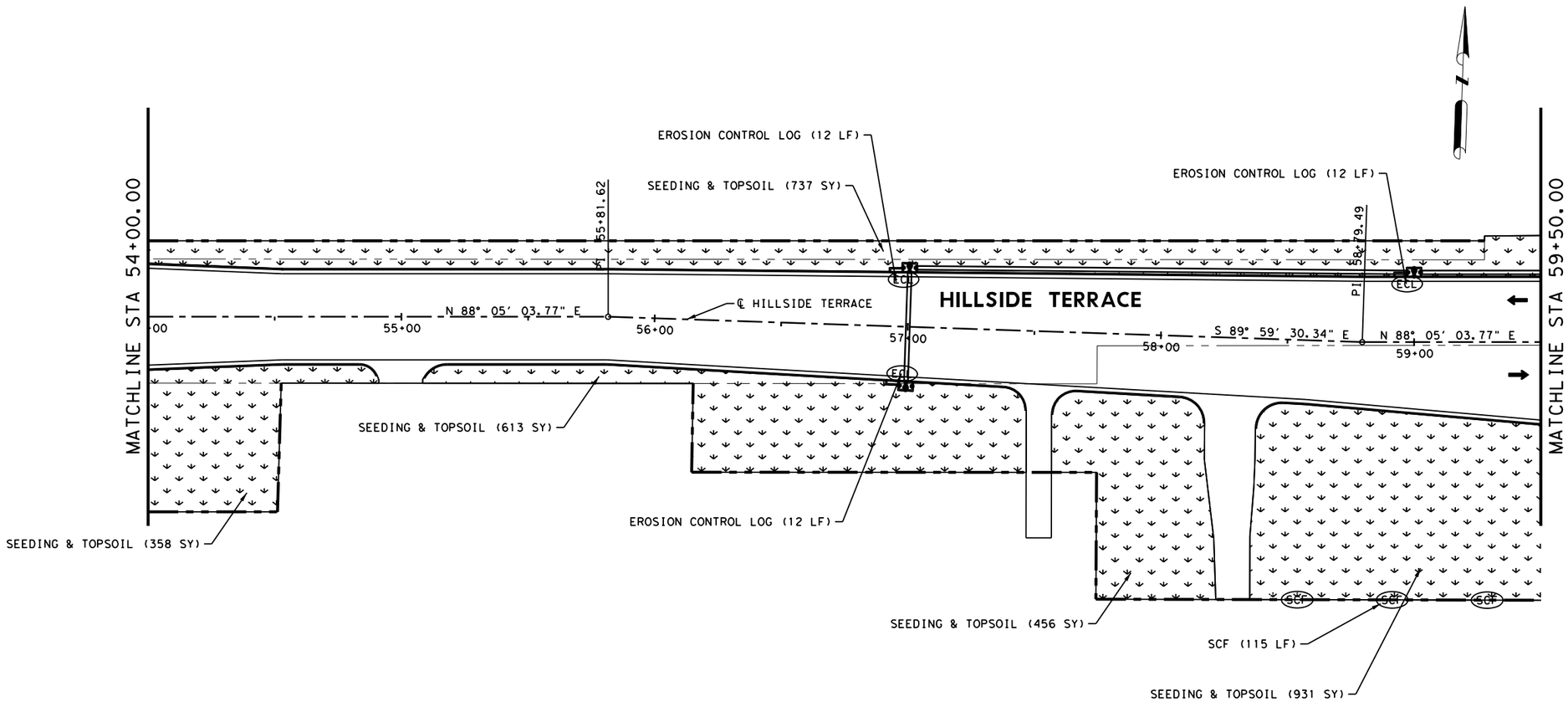
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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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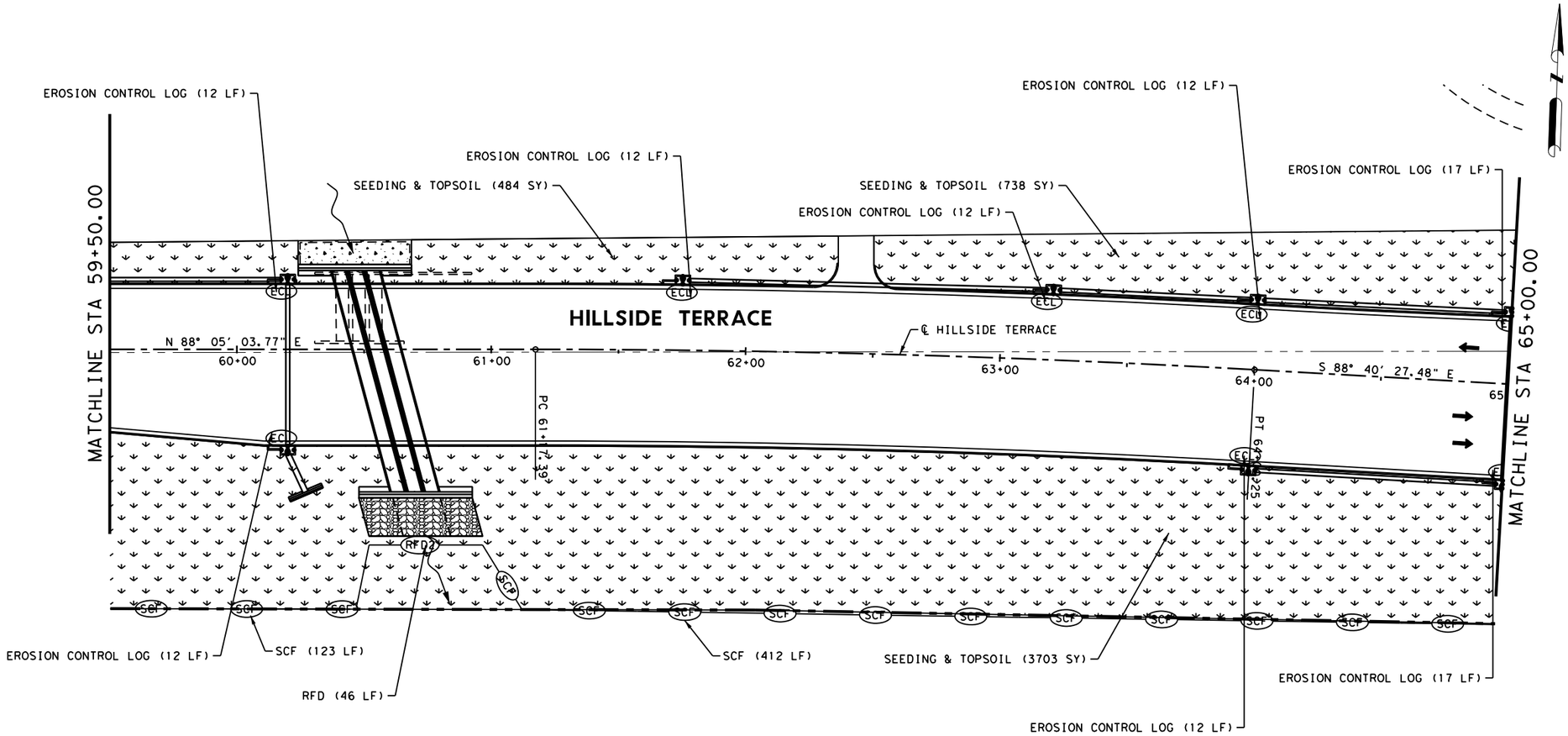
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HILLSIDE TERRACE

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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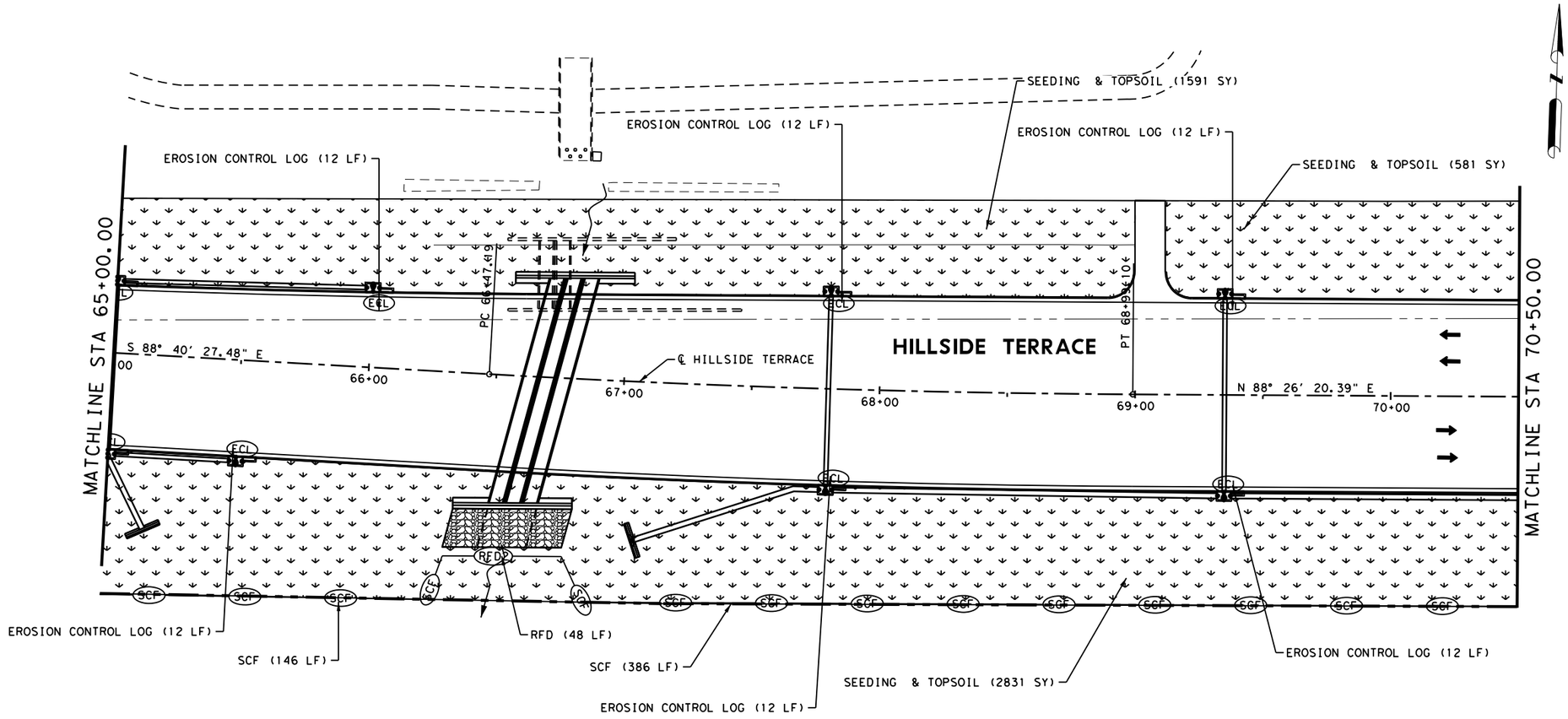
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HILLSIDE TERRACE

SW3P LAYOUT

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LEGEND

- DITCH FLOW
- EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- ROCK FILTER DAM
- TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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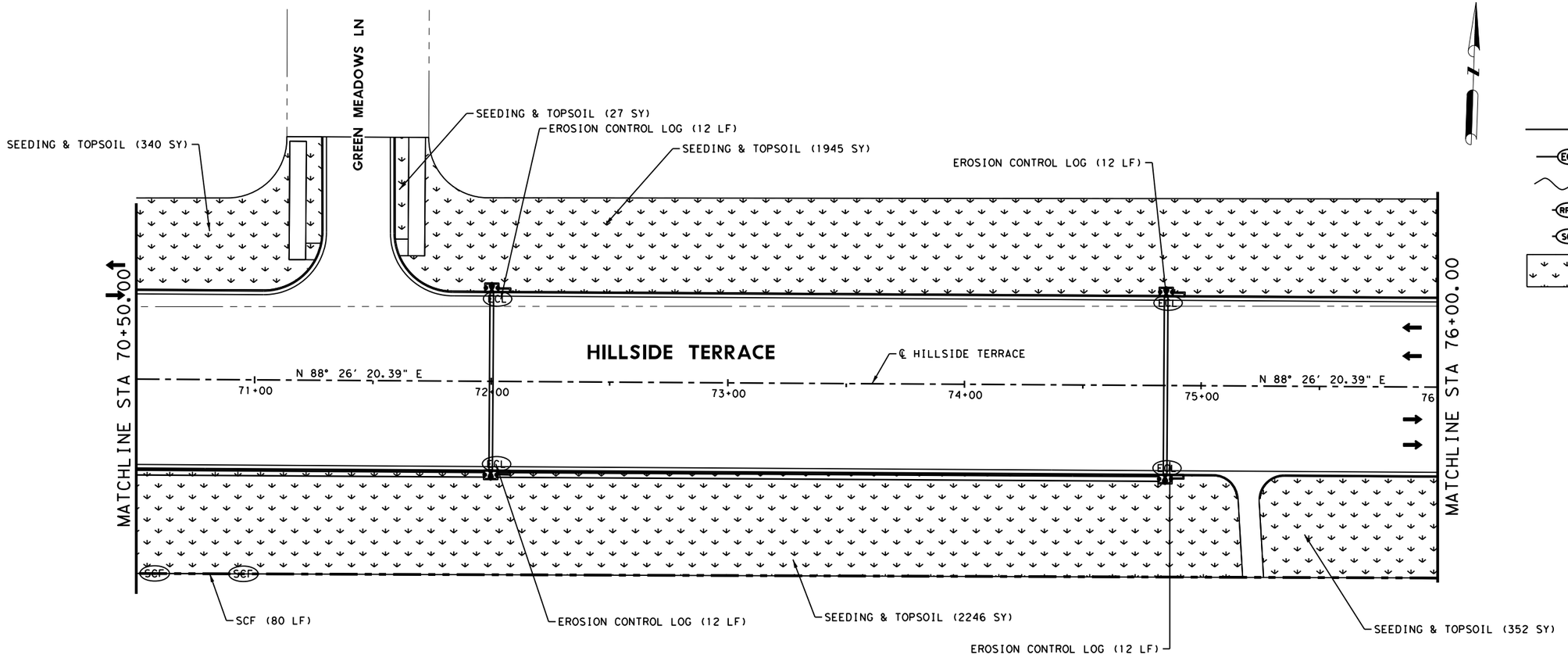
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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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HAYS COUNTY STATE OF TEXAS

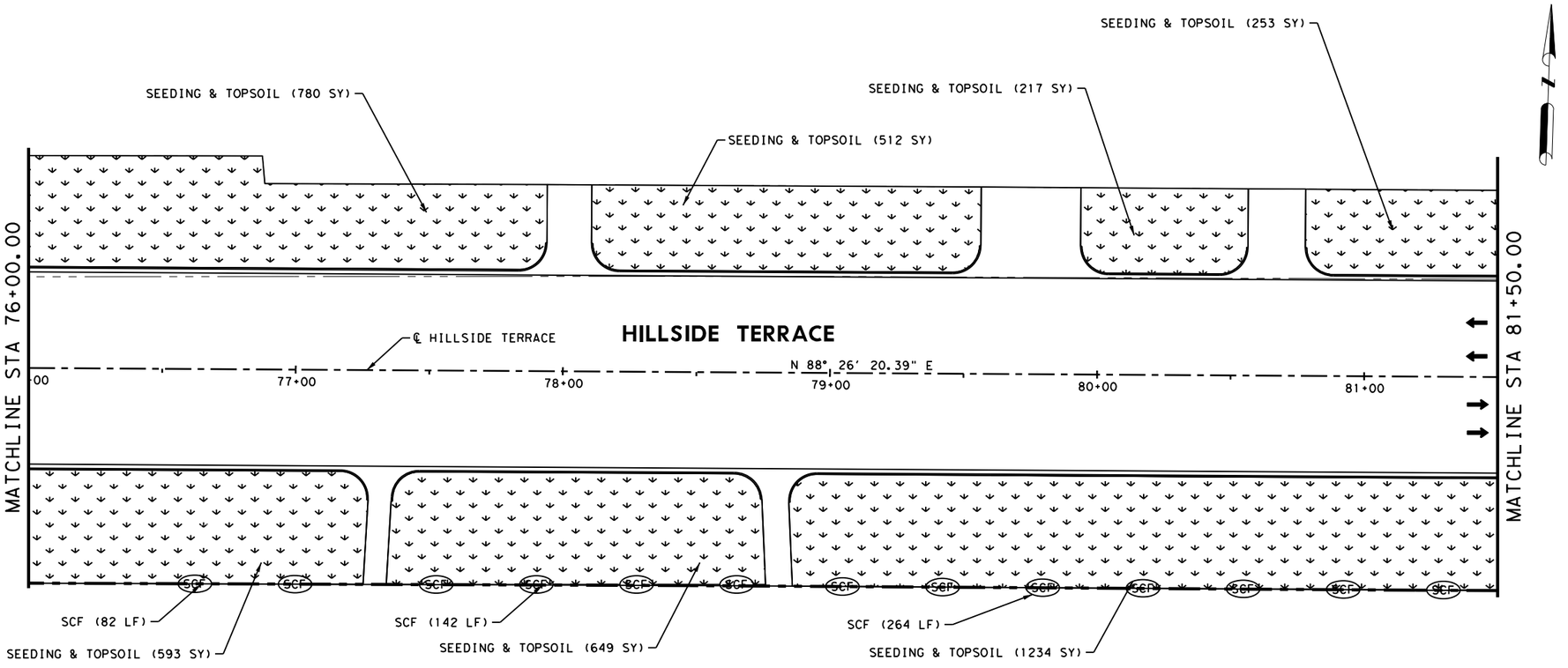
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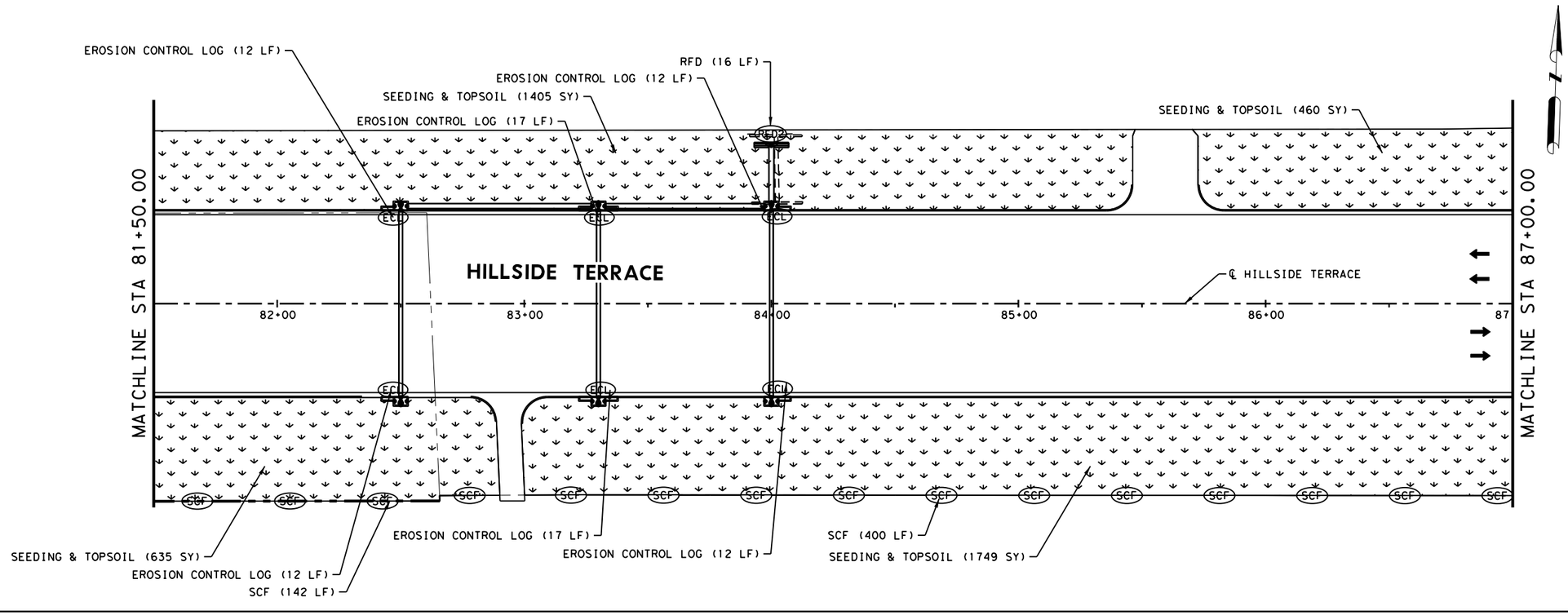
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SW3P LAYOUT

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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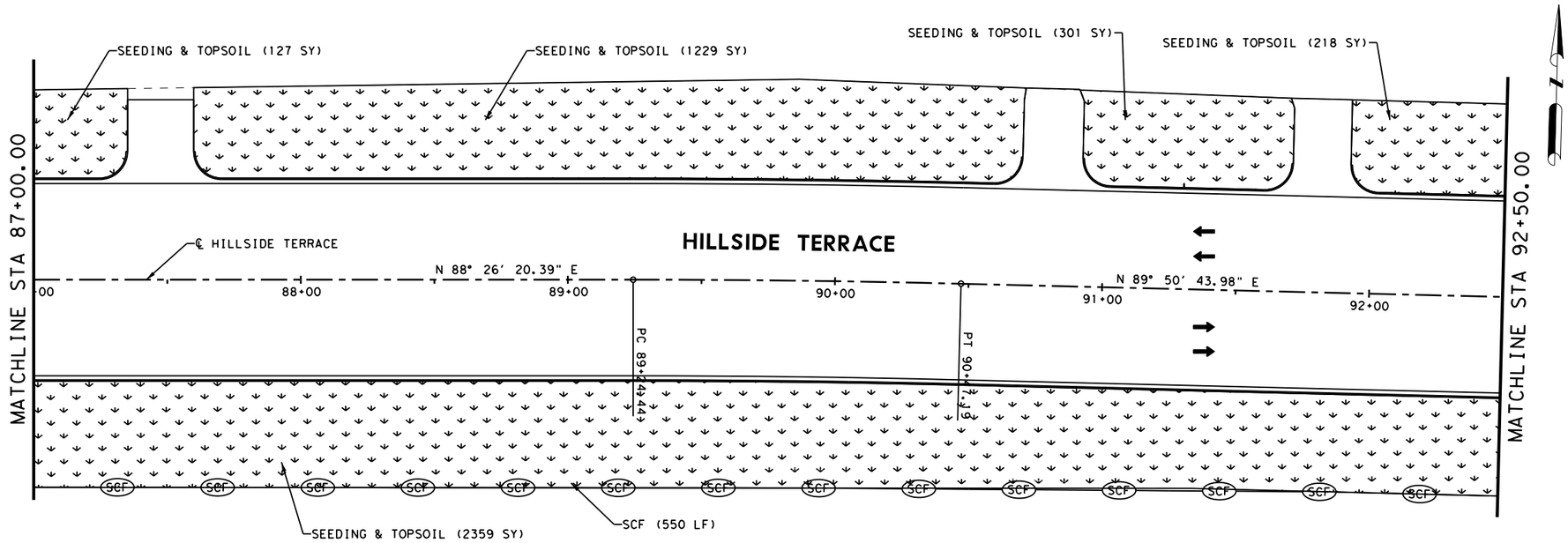
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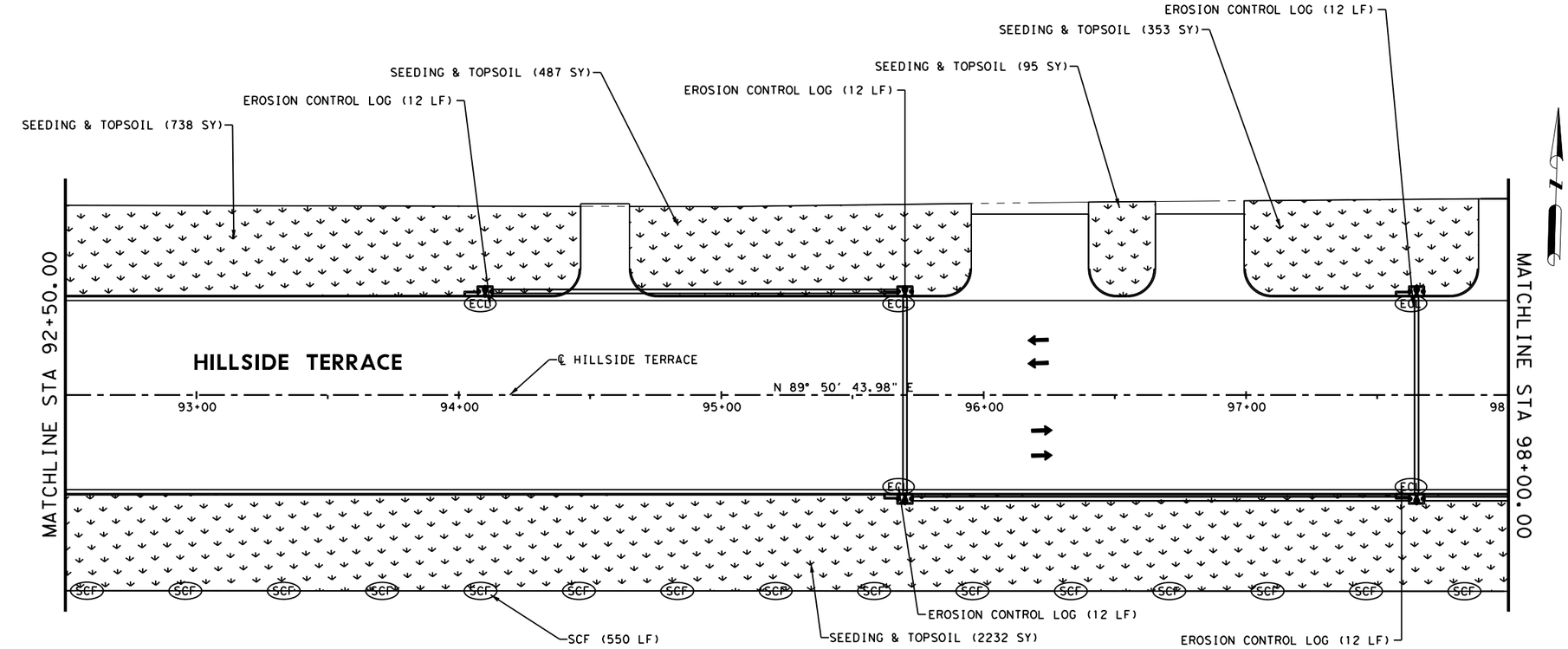
HILLSIDE TERRACE

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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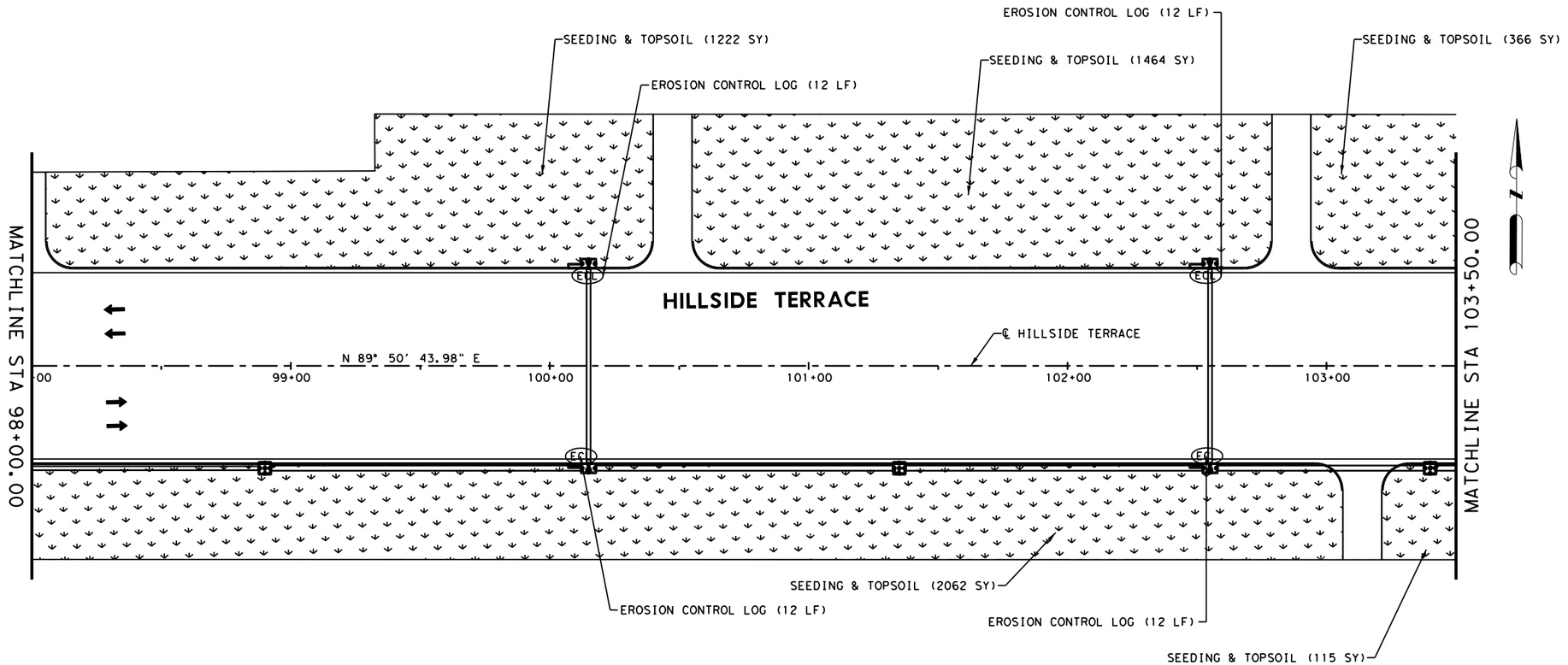
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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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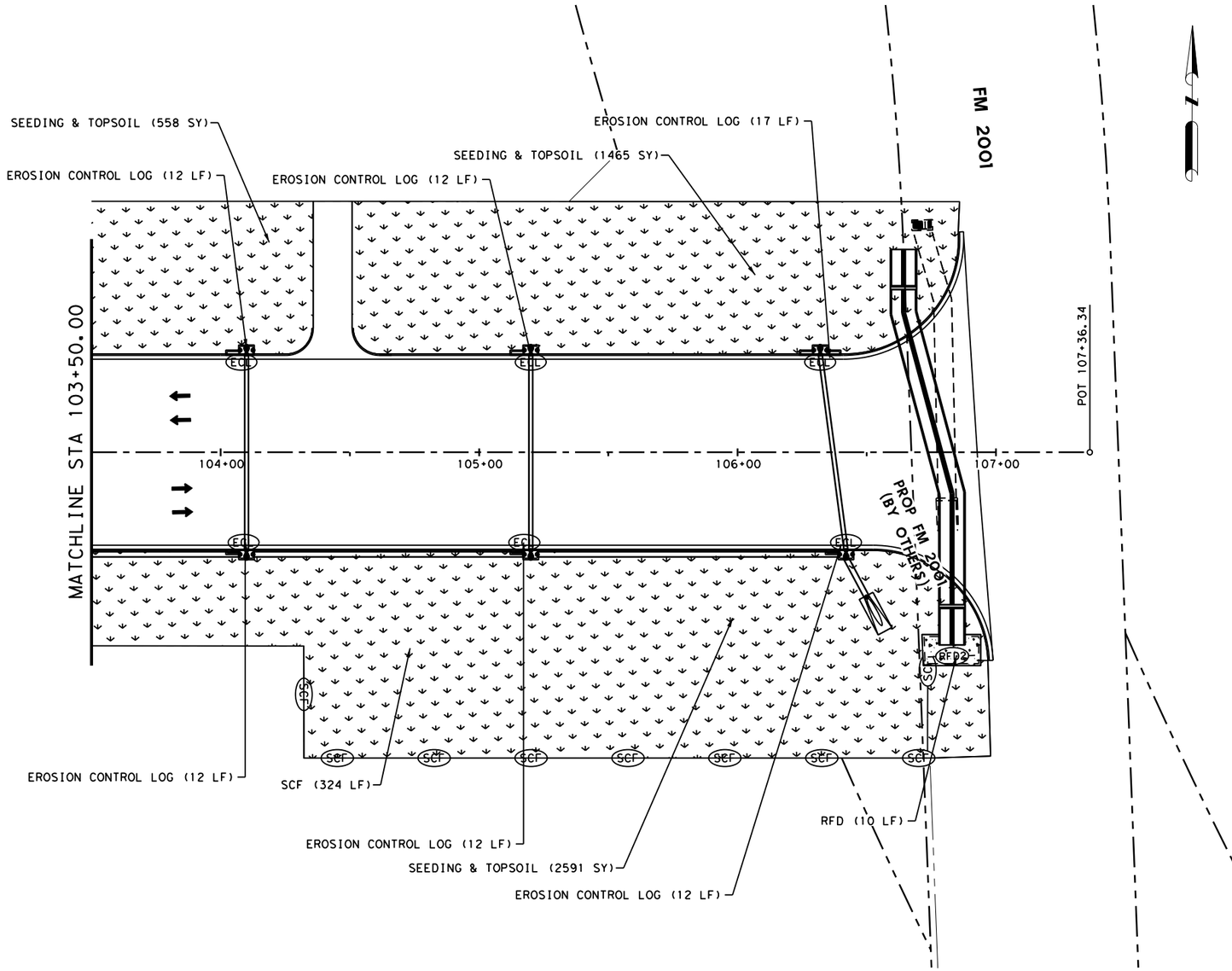
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HILLSIDE TERRACE

SW3P LAYOUT

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LEGEND

- DITCH FLOW
- EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- ROCK FILTER DAM
- TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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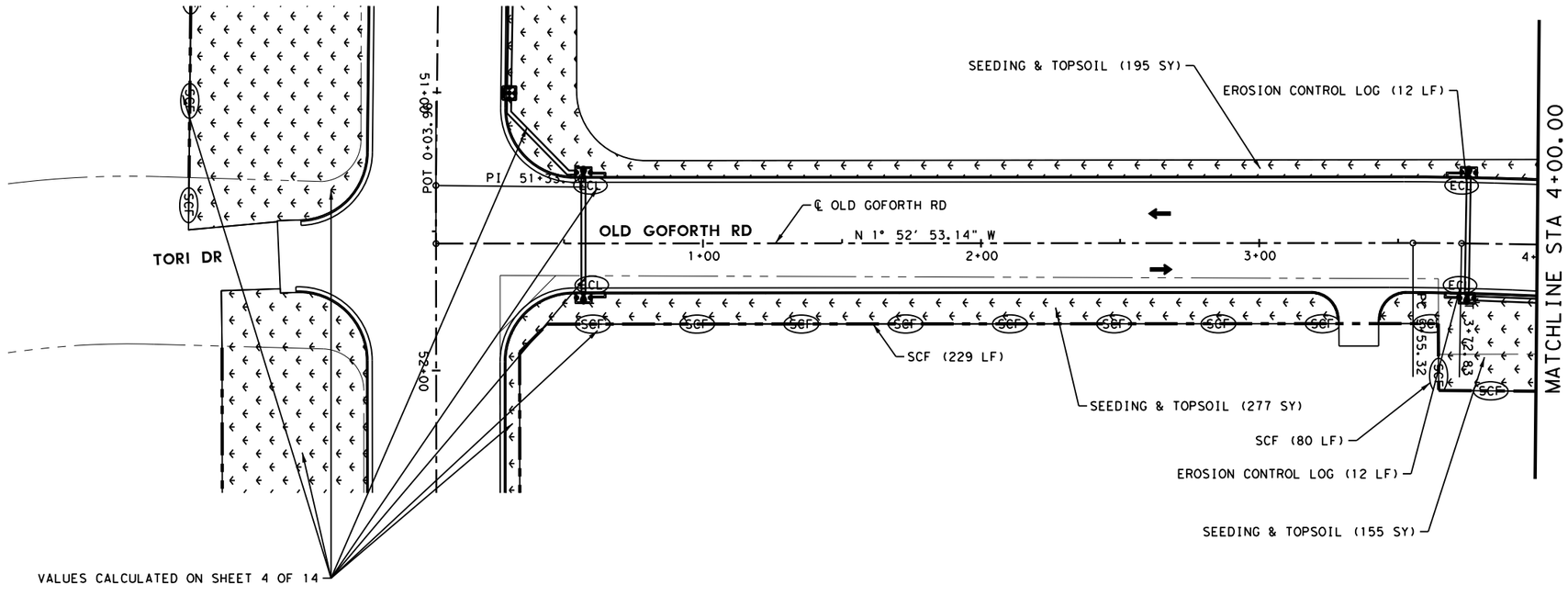
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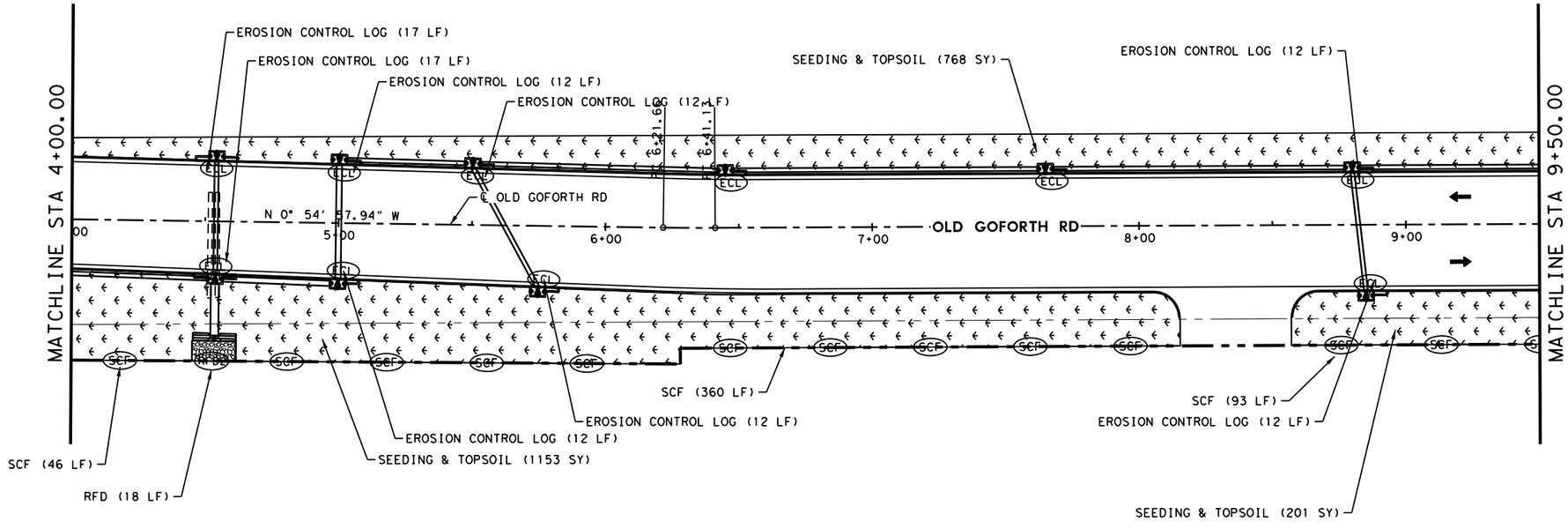
HILLSIDE TERRACE

SW3P LAYOUT

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LEGEND

- DITCH FLOW
- ECL — EROSION CONTROL LOGS
- CULVERT FLOW DIRECTION
- RFD2 — ROCK FILTER DAM
- SCF — TEMPORARY SEDIMENT CNTRL FENCE
- SEEDING & TOPSOIL

0 25 50

SCALE: 1"=50'

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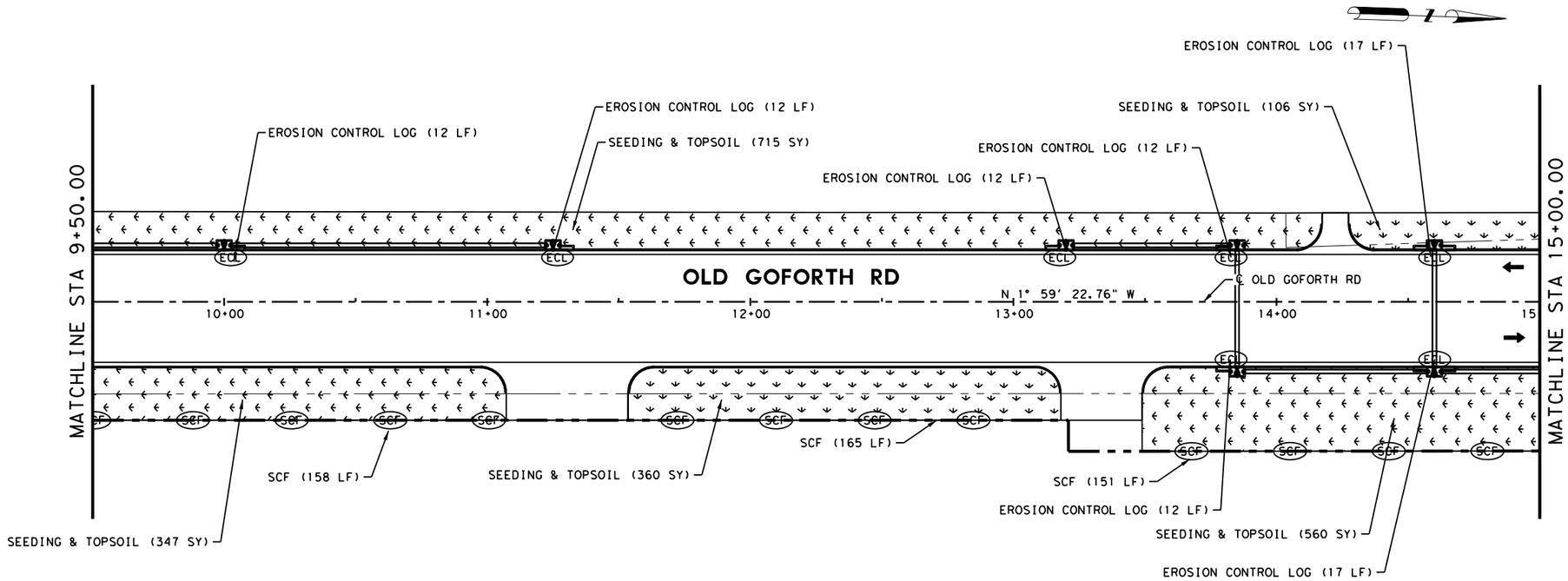
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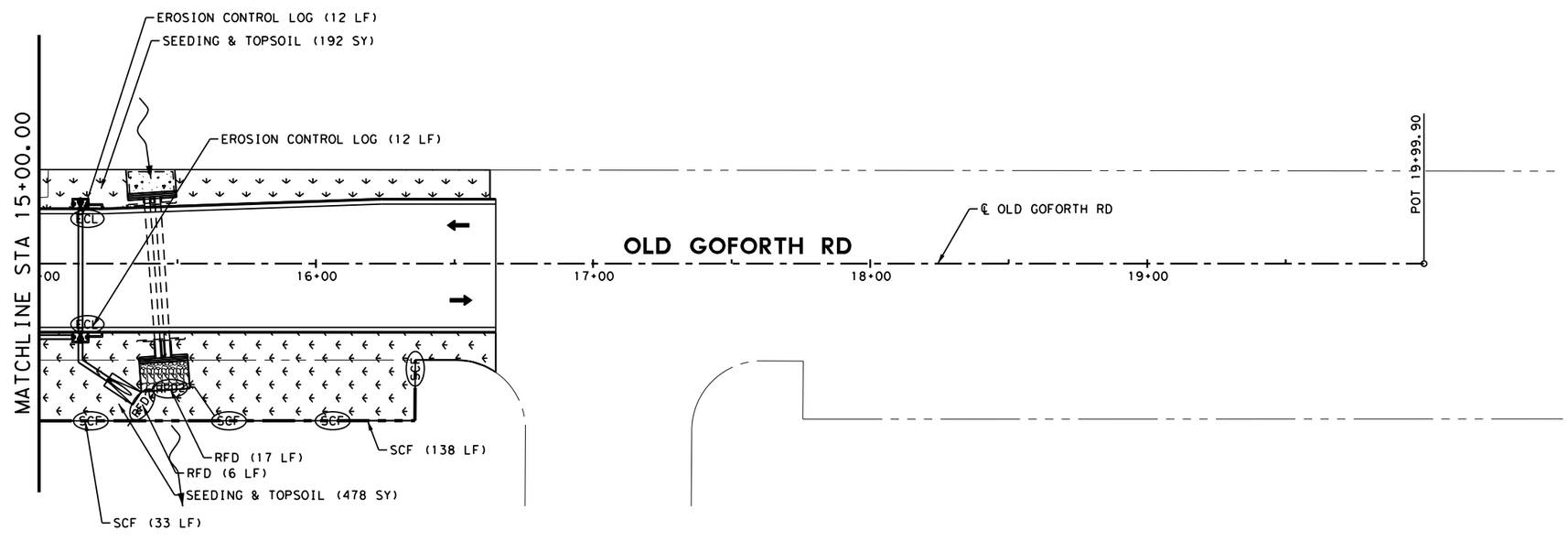
HILLSIDE TERRACE

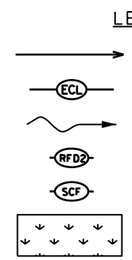
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OLD GOFORTH DR

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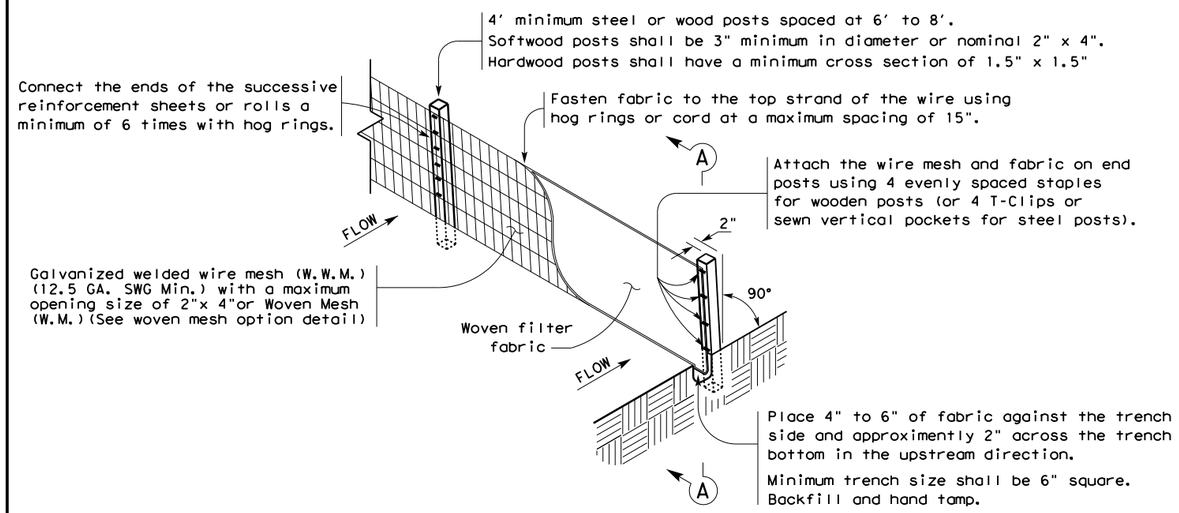
HILLSIDE TERRACE

SW3P LAYOUT
OLD GOFORTH DR

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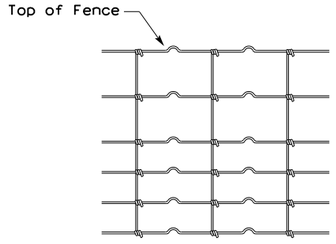
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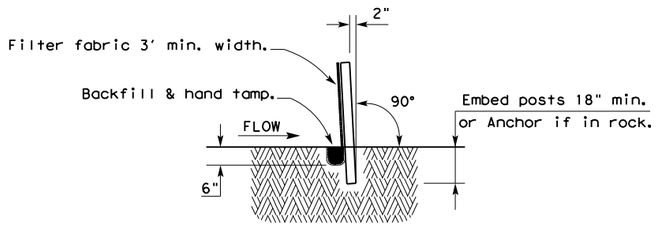
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TEMPORARY SEDIMENT CONTROL FENCE

SCF





SECTION A-A

HINGE JOINT KNOT WOVEN MESH (OPTION) DETAIL

Galvanized hinge joint knot woven mesh (12.5 GA.SWG Min.) requires a minimum of five horizontal wires spaced at a maximum of 12 inches apart and all vertical wires spaced at a maximum of 12 inches apart.

SEDIMENT CONTROL FENCE USAGE GUIDELINES

A sediment control fence may be constructed near the downstream perimeter of a disturbed area along a contour to intercept sediment from overland runoff. A 2 year storm frequency may be used to calculate the flow rate to be filtered.

Sediment control fence should be sized to filter a maximum flow through rate of 100 GPM/FT^2. Sediment control fence is not recommended to control erosion from a drainage area larger than 2 acres.

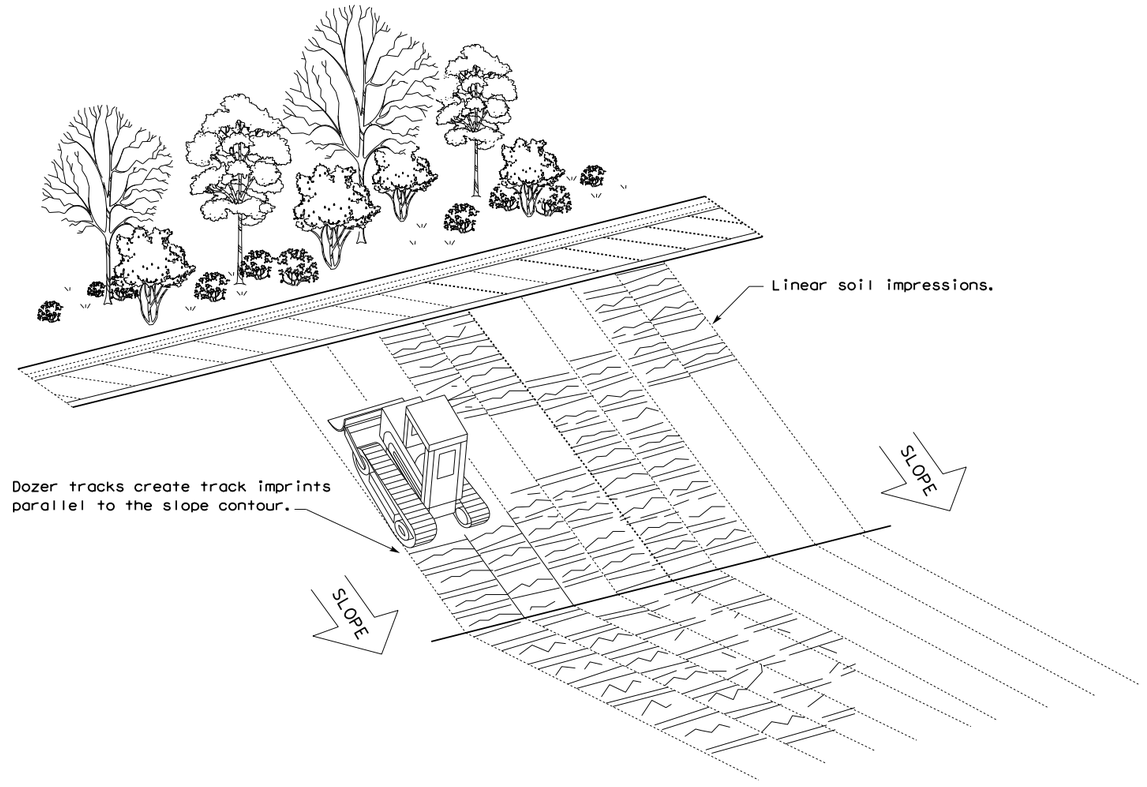
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Sediment Control Fence

SCF

GENERAL NOTES

1. Vertical tracking is required on projects where soil distributing activities have occurred unless otherwise approved.
2. Perform vertical tracking on slopes to temporarily stabilize soil.
3. Provide equipment with a track undercarriage capable of producing linear soil impressions measuring a minimum of 12" in length by 2" to 4" in width by 1/2" to 2" in depth.
4. Do not exceed 12" between track impressions.
5. Install continous linear track impressions where the minimum 12" length impressions are perpendicular to the slope or direction of water flow.



VERTICAL TRACKING

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

FENCE & VERTICAL TRACKING

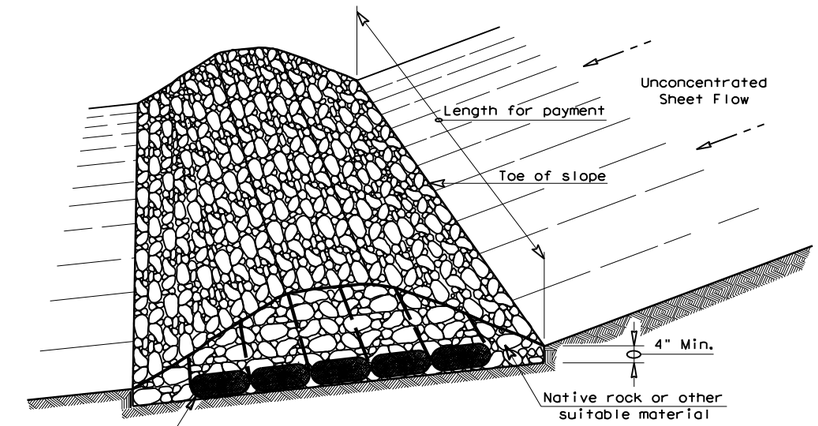
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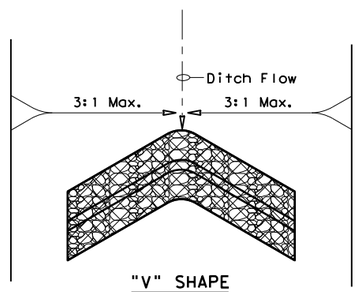
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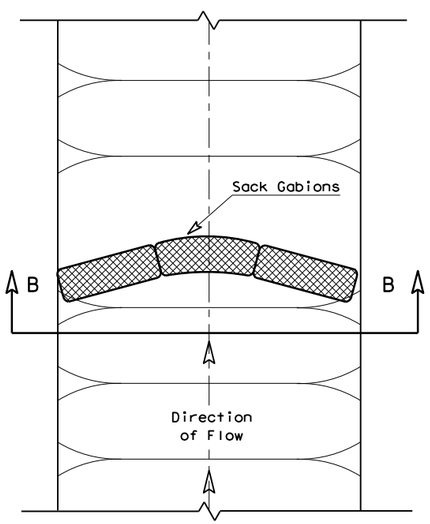


FILTER DAM AT TOE OF SLOPE

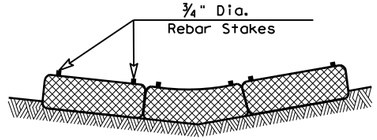
RFD1



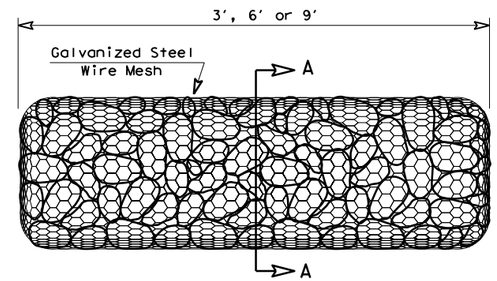
"V" SHAPE
PLAN VIEW



PLAN VIEW

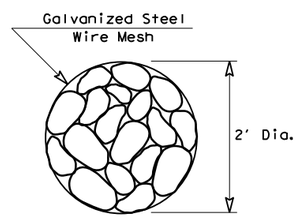


SECTION B-B

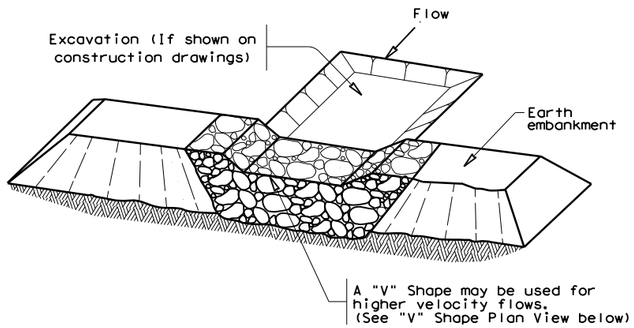


TYPE 4 (SACK GABIONS)

RFD4

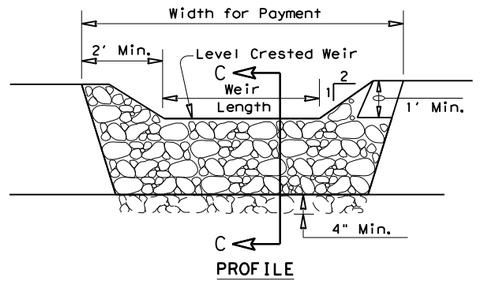


SECTION A-A

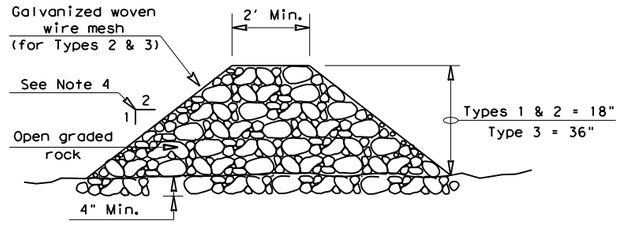


FILTER DAM AT SEDIMENT TRAP

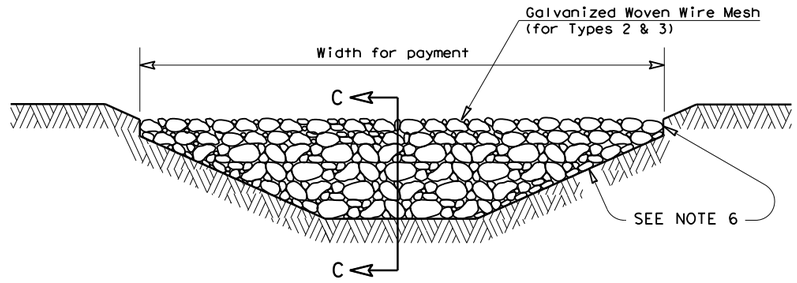
RFD1 OR RFD2



PROFILE



SECTION C-C



FILTER DAM AT CHANNEL SECTIONS

RFD1 OR RFD2 OR RFD3

ROCK FILTER DAM USAGE GUIDELINES

Rock Filter Dams should be constructed downstream from disturbed areas to intercept sediment from overland runoff and/or concentrated flow. The dams should be sized to filter a maximum flow through rate of 60 GPM/FT^2 of cross sectional area. A 2 year storm frequency may be used to calculate the flow rate.

Type 1 (18" high with no wire mesh) (3" to 6" aggregate): Type 1 may be used at the toe of slopes, around inlets, in small ditches, and at dike or swale outlets. This type of dam is recommended to control erosion from a drainage area of 5 acres or less. Type 1 may not be used in concentrated high velocity flows (approximently 8 Ft/Sec or more) in which aggregate wash out may occur. Sandbags may be used at the embedded foundation (4" deep min.) for better filtering efficiency of low flows if called for on the plans or directed by the Engineer.

Type 2 (18" high with wire mesh) (3" to 6" aggregate): Type 2 may be used in ditches and at dike or swale outlets.

Type 3 (36" high with wire mesh) (4" to 8" aggregate): Type 3 may be used in stream flow and should be secured to the stream bed.

Type 4 (Sack gabions) (3" to 6" aggregate): Type 4 May be used in ditches and smaller channels to form an erosion control dam.

Type 5: Provide rock filter dams as shown on plans.

GENERAL NOTES

1. If shown on the plans or directed by the Engineer, filter dams should be placed near the toe of slopes where erosion is anticipated, upstream and/or downstream at drainage structures, and in roadway ditches and channels to collect sediment.
2. Materials (aggregate, wire mesh, sandbags, etc.) shall be as indicated by the specification for "Rock Filter Dams for Erosion and Sedimentation Control".
3. The rock filter dam dimensions shall be as indicated on the SW3P plans.
4. Side slopes should be 2:1 or flatter. Dams within the safety zone shall have sideslopes of 6:1 or flatter.
5. Maintain a minimum of 1' between top of rock filter dam weir and top of embankment for filter dams at sediment traps.
6. Filter dams should be embedded a minimum of 4" into existing ground.
7. The sediment trap for ponding of sediment laden runoff shall be of the dimensions shown on the plans.
8. Rock filter dam types 2 & 3 shall be secured with 20 gauge galvanized woven wire mesh with 1" diameter hexagonal openings. The aggregate shall be placed on the mesh to the height & slopes specified. The mesh shall be folded at the upstream side over the aggregate and tightly secured to itself on the downstream side using wire ties or hog rings. For in stream use, the mesh should be secured or staked to the stream bed prior to aggregate placement.
9. Sack Gabions should be staked down with ¾" dia. rebar stakes, and have a double-twisted hexagonal weave with a nominal mesh opening of 2 ½" x 3 ¼"
10. Flow outlet should be onto a stabilized area (vegetation, rock, etc.).
11. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

PLAN SHEET LEGEND

Type 1 Rock Filter Dam	RFD1
Type 2 Rock Filter Dam	RFD2
Type 3 Rock Filter Dam	RFD3
Type 4 Rock Filter Dam	RFD4

Texas Department of Transportation — Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

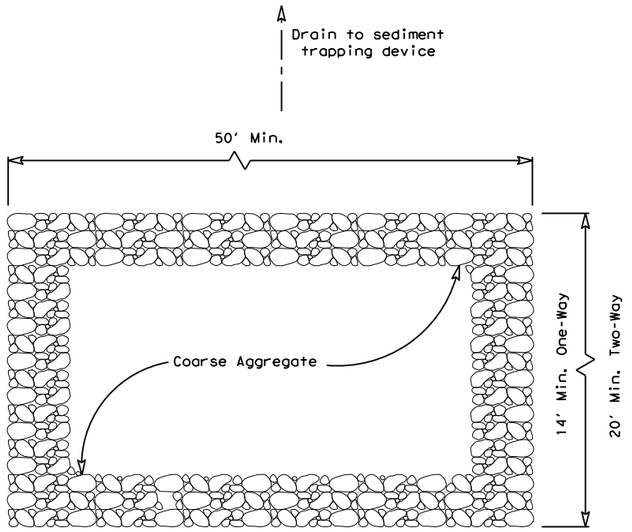
ROCK FILTER DAMS

EC(2)-16

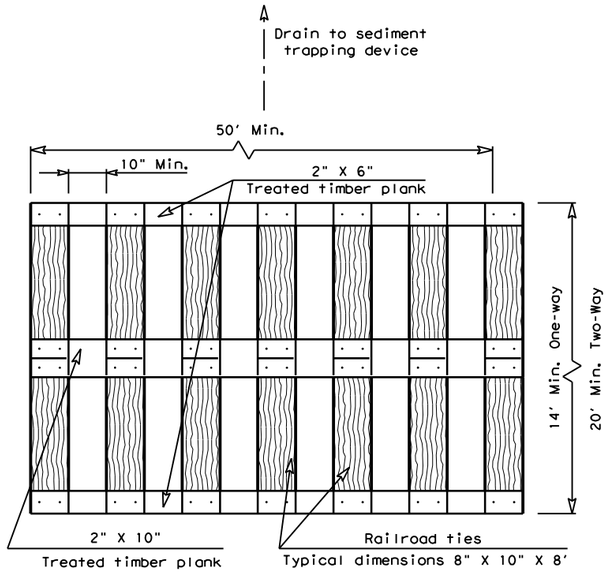
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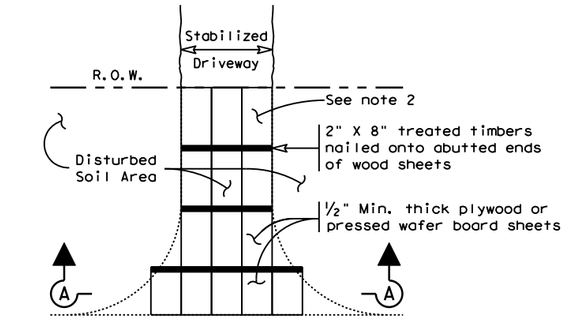
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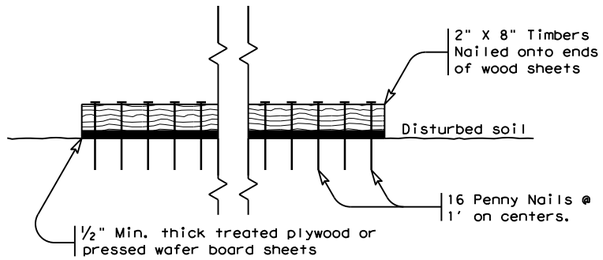
PLAN VIEW



PLAN VIEW



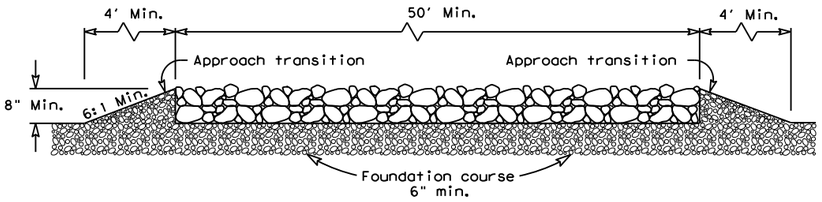
PLAN VIEW



SECTION A-A

CONSTRUCTION EXIT (TYPE 3)

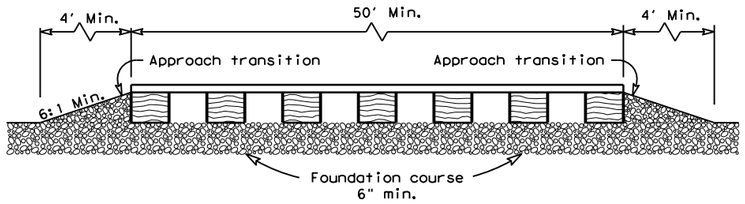
SHORT TERM



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 1)

ROCK CONSTRUCTION (LONG TERM)



ELEVATION VIEW

CONSTRUCTION EXIT (TYPE 2)

TIMBER CONSTRUCTION (LONG TERM)

GENERAL NOTES (TYPE 1)

1. The length of the type 1 construction exit shall be as indicated on the plans, but not less than 50'.
2. The coarse aggregate should be open graded with a size of 4" to 8".
3. The approach transitions should be no steeper than 6:1 and constructed as directed by the Engineer.
4. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other materialas approved by the Engineer.
5. The construction exit shall be graded to allow drainage to a sediment trapping device.
6. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
7. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 2)

1. The length of the type 2 construction exit shall be as indicated on the plans, but not less than 50'.
2. The treated timber planks shall be attached to the railroad ties with ½"x 6" min. lag bolts. Other fasteners may be used as approved by the Engineer.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The approach transitions shall be no steeper than 6:1 and constructed as directed by the Engineer.
5. The construction exit foundation course shall be flexible base, bituminous concrete, portland cement concrete or other material as approved by the Engineer.
6. The construction exit should be graded to allow drainage to a sediment trapping device.
7. The guidelines shown hereon are suggestions only and may be modified by the Engineer.
8. Construct exits with a width of at least 14 ft. for one-way and 20 ft. for two-way traffic for the full width of the exit, or as directed by the engineer.

GENERAL NOTES (TYPE 3)

1. The length of the type 3 construction exit shall be as shown on the plans, or as directed by the Engineer.
2. The type 3 construction exit may be constructed from open graded crushed stone with a size of two to four inches spread a min. of 4" thick to the limits shown on the plans.
3. The treated timber planks shall be #2 grade min., and should be free from large and loose knots.
4. The guidelines shown hereon are suggestions only and may be modified by the Engineer.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

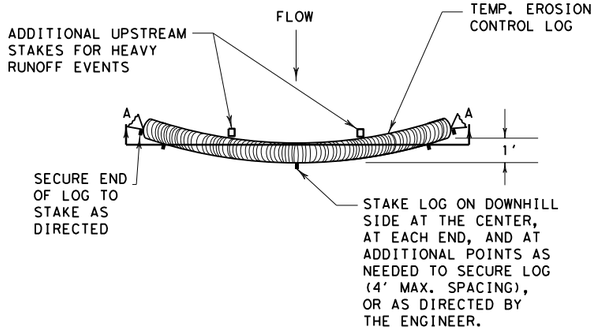
CONSTRUCTION EXITS

EC(3)-16

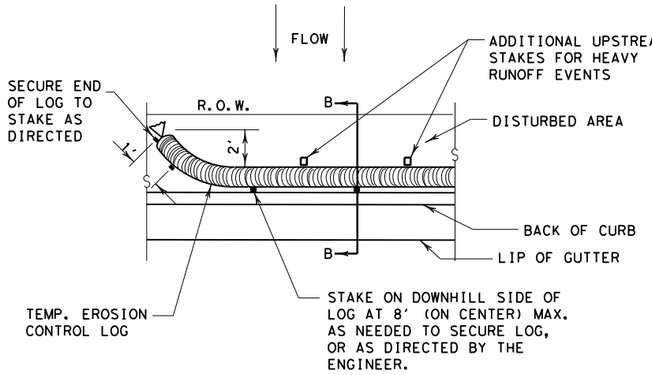
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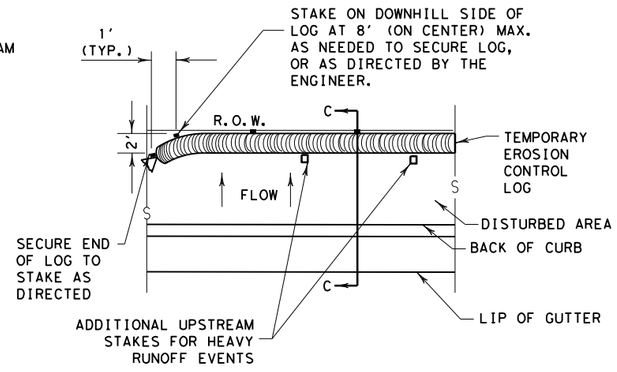
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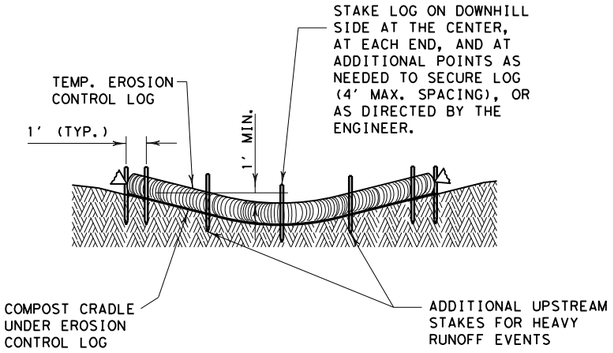
PLAN VIEW



PLAN VIEW



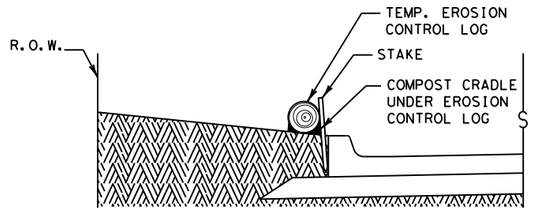
PLAN VIEW



SECTION A-A

EROSION CONTROL LOG DAM

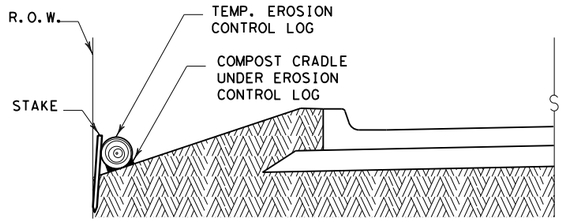
CL-D



SECTION B-B

EROSION CONTROL LOG AT BACK OF CURB

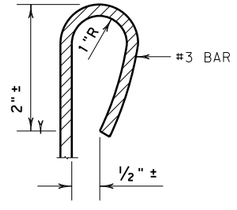
CL-BOC



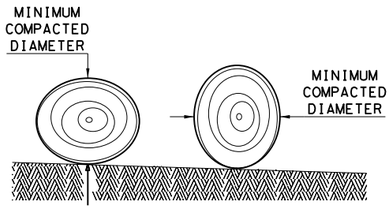
SECTION C-C

EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY

CL-ROW



REBAR STAKE DETAIL



DIAMETER MEASUREMENTS OF EROSION CONTROL LOGS SPECIFIED IN PLANS

GENERAL NOTES:

1. EROSION CONTROL LOGS SHALL BE INSTALLED IN ACCORDANCE WITH MANFACTURER'S RECOMMENDATIONS, OR AS DIRECTED BY THE ENGINEER.
2. LENGTHS OF EROSION CONTROL LOGS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND AS REQUIRED FOR THE PURPOSE INTENDED.
3. UNLESS OTHERWISE DIRECTED, USE BIODEGRADABLE OR PHOTODEGRADABLE CONTAINMENT MESH ONLY WHERE LOG WILL REMAIN IN PLACE AS PART OF A VEGETATIVE SYSTEM. FOR TEMPORARY INSTALLATIONS, USE RECYCLABLE CONTAINMENT MESH.
4. FILL LOGS WITH SUFFICIENT FILTER MATERIAL TO ACHIEVE THE MINIMUM COMPACTED DIAMETER SPECIFIED IN THE PLANS WITHOUT EXCESSIVE DEFORMATION.
5. STAKES SHALL BE 2" X 2" WOOD OR #3 REBAR, 2'-4' LONG, EMBEDDED SUCH THAT 2" PROTRUDES ABOVE LOG, OR AS DIRECTED BY THE ENGINEER.
6. DO NOT PLACE STAKES THROUGH CONTAINMENT MESH.
7. COMPOST CRADLE MATERIAL IS INCIDENTAL & WILL NOT BE PAID FOR SEPARATELY.
8. SANDBAGS USED AS ANCHORS SHALL BE PLACED ON TOP OF LOGS & SHALL BE OF SUFFICIENT SIZE TO HOLD LOGS IN PLACE.
9. TURN THE ENDS OF EACH ROW OF LOGS UPSLOPE TO PREVENT RUNOFF FROM FLOWING AROUND THE LOG.
10. FOR HEAVY RUNOFF EVENTS, ADDITIONAL UPSTREAM STAKES MAY BE NECESSARY TO KEEP LOG FROM FOLDING IN ON ITSELF.

LEGEND

- CL-D — EROSION CONTROL LOG DAM
- CL-BOC — EROSION CONTROL LOG AT BACK OF CURB
- CL-ROW — EROSION CONTROL LOG AT EDGE OF RIGHT-OF-WAY
- CL-SST — EROSION CONTROL LOGS ON SLOPES STAKE AND TRENCHING ANCHORING
- CL-SSL — EROSION CONTROL LOGS ON SLOPES STAKE AND LASHING ANCHORING
- CL-DI — EROSION CONTROL LOG AT DROP INLET
- CL-CI — EROSION CONTROL LOG AT CURB INLET
- CL-GI — EROSION CONTROL LOG AT CURB & GRATE INLET

SEDIMENT BASIN & TRAP USAGE GUIDELINES

An erosion control log sediment trap may be used to filter sediment out of runoff draining from an unstabilized area.

Log Traps: The drainage area for a sediment trap should not exceed 5 acres. The trap capacity should be 1800 CF/Acre (0.5" over the drainage area).

Control logs should be placed in the following locations:

1. Within drainage ditches spaced as needed or min. 500' on center
2. Immediately preceding ditch inlets or drain inlets
3. Just before the drainage enters a water course
4. Just before the drainage leaves the right of way
5. Just before the drainage leaves the construction limits where drainage flows away from the project.

The logs should be cleaned when the sediment has accumulated to a depth of 1/2 the log diameter.

Cleaning and removal of accumulated sediment deposits is incidental and will not be paid for separately.

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

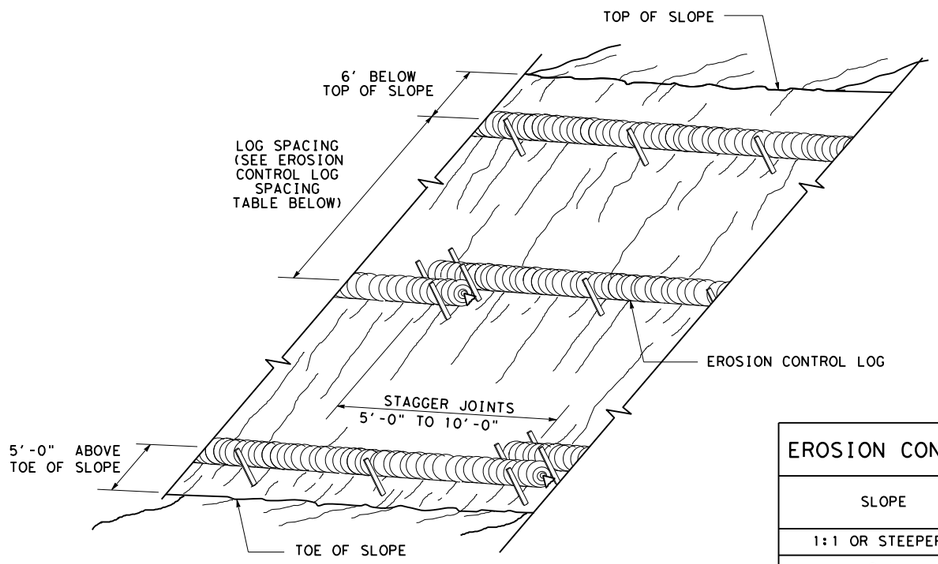
EROSION CONTROL LOG

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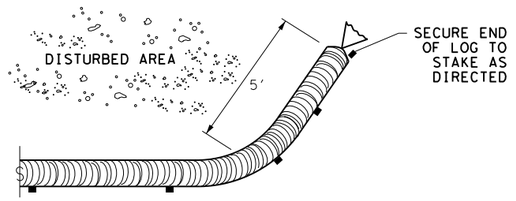
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EROSION CONTROL LOGS ON SLOPES
STAKE AND TRENCHING ANCHORING

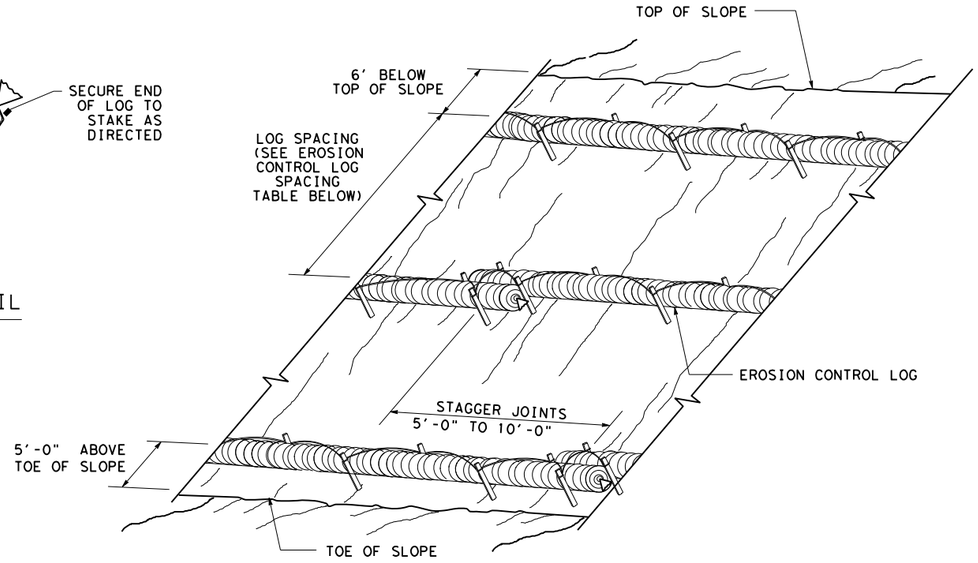
CL-SST



END SECTION RAP DETAIL

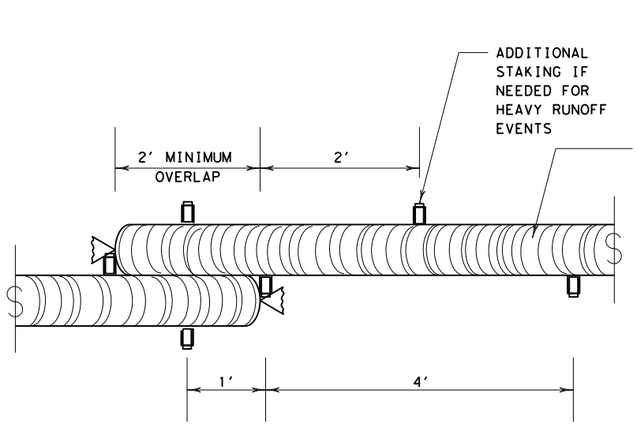
EROSION CONTROL LOG SPACING TABLE				
SLOPE	LOG DIAMETER			
	6"	8"	12"	18"
1:1 OR STEEPER	5'	10'	15'	20'
2:1	10'	20'	30'	40'
3:1	15'	30'	45'	60'
4:1 OR FLATTER	20'	40'	60'	80'

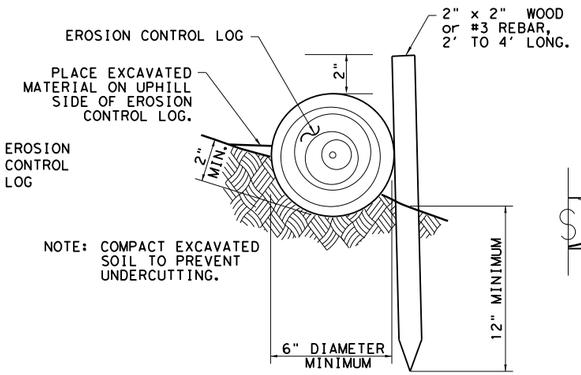
* ADJUSTMENTS CAN BE MADE FOR SOIL TYPE:
SOFT, LOAMY SOILS-ADJUST ROWS CLOSER TOGETHER;
HARD, ROCKY SOILS- ADJUST ROWS FARTHER APART



EROSION CONTROL LOGS ON SLOPES
STAKE AND LASHING ANCHORING

CL-SSL

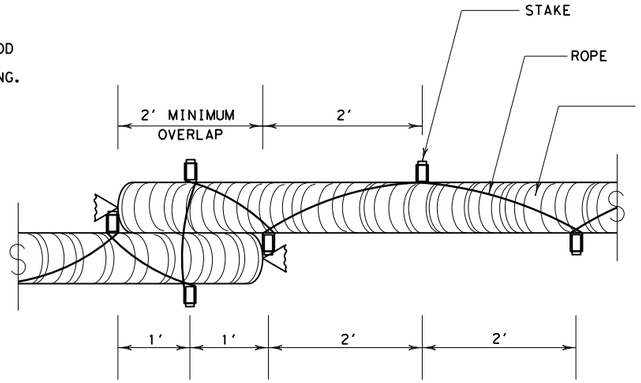


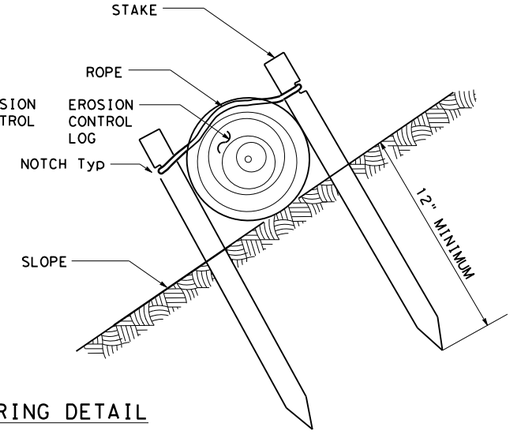


STAKE AND TRENCHING ANCHORING DETAIL

CL-SST

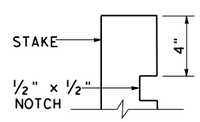
TRENCH DEPTH TABLE	
LOG DIAMETER	DEPTH
6"	2"
8"	3"
12"	4"
18"	5"





STAKE AND LASHING ANCHORING DETAIL

CL-SSL



STAKE NOTCH DETAIL

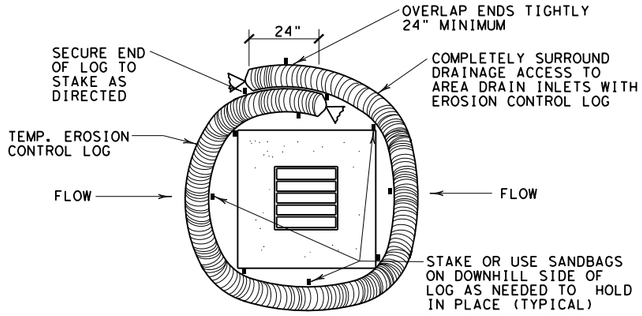
Texas Department of Transportation | Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES
EROSION CONTROL LOG
EC(9)-16

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REVISIONS				HILLSIDE TER	
	DIST	COUNTY		SHEET NO.	
	AUS	HAYS		276	

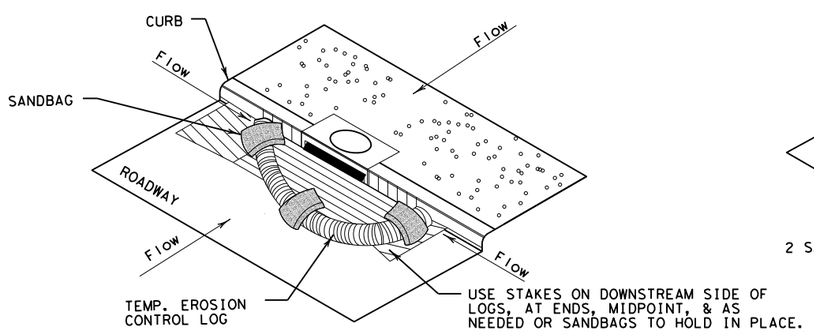
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FILE: c:\pwworkdir\bgepw-projects\mhancock\dms05998\ec916.dgn



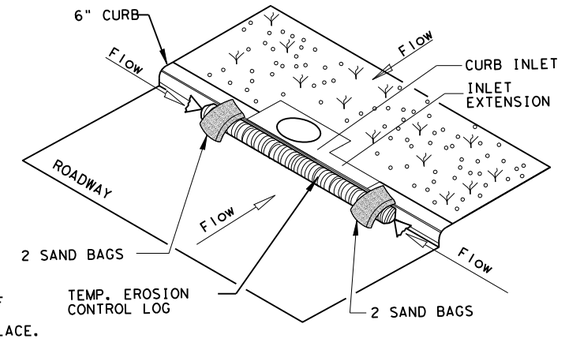
EROSION CONTROL LOG AT DROP INLET

CL-DI



EROSION CONTROL LOG AT CURB INLET

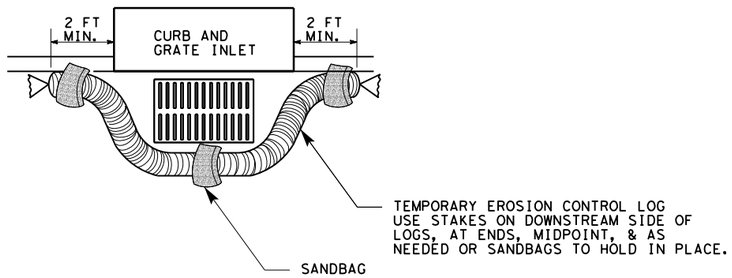
CL-CI



EROSION CONTROL LOG AT CURB INLET

CL-CI

NOTE:
EROSION CONTROL LOGS USED AT CURB INLETS SHOULD ONLY BE USED IF THEY WILL NOT IMPEDE TRAFFIC OR FLOOD THE ROADWAY OR WHEN THE STORM SEWER SYSTEM IS NOT FULLY FUNCTIONAL.

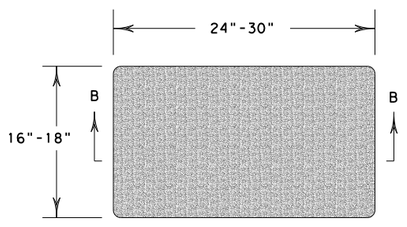


EROSION CONTROL LOG AT CURB & GRADE INLET

CL-GI



SECTION B-B



SANDBAG DETAIL

SHEET 3 OF 3

Texas Department of Transportation

Design Division Standard

TEMPORARY EROSION, SEDIMENT AND WATER POLLUTION CONTROL MEASURES

EROSION CONTROL LOG

EC(9)-16

FILE: ec916	DN: TxDOT		CK: KM	DW: LS/PT		CK: LS
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REVISIONS					HILLSIDE TER	
	DIST	COUNTY			SHEET NO.	
	AUS	HAYS			277	